ISSN 1018-5593

European Commission

Evaluation of the Radiation Protection Research Action (1990-1991 and 1992-1993)

Research evaluation – Report No. 64

Report
EUR 15878 EN

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Evaluation of the Radiation Protection Research Action (1990-1991 and 1992-1993)

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1994

Published by the

EUROPEAN COMMISSION

DIRECTORATE GENERAL XIII
Telecommunications, Information Market and Exploitation of Research
L-2920 Luxembourg

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Cataloguing data can be found at the end of this publication

Luxembourg: Office for Official Publications of the European Communities, 1994

ISBN 92-826-8614-0

Printed in Belgium

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ACKNOWLEDGEMENT

We would like to express our thanks to the staff of the Radiation Protection Research Action for providing all the documents and information that were needed for our work. Our special thanks go to Mr. I. Karatzas who provided excellent arrangements for all our work.

LIST OF ABBREVIATIONS

ALARA	:	As Low As Reasonably Achievable
APAS	:	Preparatory, Accompanying and Support Activities
CEC	:	Commission of the European Communities
CHESIR	:	Chernobyl Centre for International Research
CIS	:	Commonwealth of Independent States
CNS	:	Central Nervous System
COSYMA	:	Code System of the MARIA Project
DG	:	Directorate General
DNA	:	Deoxyribonucleic Acid
EC	:	European Commission
ECP	:	Experimental Collaboration Projects
EFTA	:	European Free Trade Association
ERASMUS	:	The European Programme on Student Mobility and Cooperation between Higher Education Institutes
EU	:	European Union
EULEP	:	European Late Effects Project Group
EURADOS	:	European Radiation Dosimetry Group
IAEA	:	International Atomic Energy Agency
IARC	:	International Agency for Research on Cancer
ICRP	:	International Commission on Radiological Protection
ICRU	:	International Commission on Radiation Units and Measurements
ILO	:	International Labour Organisation
IRPA	:	International Radiation Protection Association

IUR	:	International Union of Radioecologists
JSP	:	Joint Study Projects
MARIA	:	Methods for the Assessment of the Radiological Impacts of Accidents
OECD-NEA	:	Organisation for Economic Cooperation and Development - Nuclear Energy Agency
PECO	:	Central and Eastern European Countries
UNSCEAR	:	United Nations Scientific Committee on the Effects of Atomic Radiation
WHO	:	World Health Organisation

EXECUTIVE SUMMARY

The terms of reference of the Panel are briefly described in Chapter 1. The detailed examinations by the Panel are given in the appropriate following chapters and specific recommendations follow this summary. However, the general conclusions can be summarised:

- The 1990-1992 programme has continued to make satisfactory progress and in some areas has made outstanding progress. It has adapted to changing needs and expanding knowledge and has shown itself to be well motivated and productive of valuable research results.

- There have been noticeable changes in the programme's approach, notably in the development of multi-national contracts, and the expansion into studies linked with work in central and eastern European countries and in forging links with research programmes outside the countries of the EU.

- The programme is effectively managed. The use of expert advisors is not extensively exploited, for instance in the peer review of research proposals, but is mainly restricted to the involvement of a few of them in the CGC.

- There is a need for continual vigilance to ensure that research results are fully considered in developing the social and legislative policies of the EU. There are some organisational aspects in this area included in the Recommendations.

- There is also still a need to make swifter and more "user friendly" the administration and financial organisation which backs up the programme.

Specific points of comment are expanded in the succeeding chapters and include:

Chapter 3

The general balance of the programme has varied a little with time and we have made recommendations about one or two areas where higher priority might seem to be appropriate. In particular, we point to acute radiation injury and the significance of non-occupational radon exposures as areas of special interest.

It is important that the tragic and dramatic events at Chernobyl should not dominate discussion in the radiological protection field. We draw attention to the fact that more injury and death has been caused by less spectacular accidents such as lost sources, stolen sources, etc. than by reactors and their malfunction. It is also important to recognise that radiation protection research has much wider implications in society (medical, environmental concerns about radon, etc.) than the narrower considerations of safety and health associated with the operation of the nuclear industry.

The greatly extended use of multi-national contracts has required much hard work on the part of the Commission staff and the co-ordinators and we welcome steps that are in hand to clarify the task of the co-ordinators. The support and guidance of the CGC continues to be vital and we have commented on this and other aspects of the programme in Recommendations 16 to 30.

Recommendations 2 and 23 reflect our concern that in spite of many years of successful research and study and in spite of many attempts to improve public perception and comprehension, the present position has to be seen as unsatisfactory and it may well be that different psycho-social and communication approaches have to be utilised. This is a problem that goes beyond radiological protection and flows into the general area of the public doubts and lack of confidence about advanced science and technology generally.

Chapter 4

The development of the post-Chernobyl programme and the PECO programme have both been important and significant. The exchange of scientists between the CIS and the EU has our full support and the programmes seem to be evolving in a satisfactory manner. At present, however, there are not sufficient results available for us to make an effective evaluation of this work. We recommend that in a year or two when sufficient results and reports have accumulated this should be an area for further evaluation. Future work in the post-Chernobyl programme will require firm integration, not only within individual projects but between project teams; we were given strong indications that that aspect is being firmly addressed.

Chapter 5

We have paid particular attention to training as have previous reports. The interaction between national training programmes and community-wide activities is important and we see a need for strong co-ordination by a clearly defined mechanism in this field. Perhaps it should have a higher publicity profile and certainly the training budget should be clearly differentiated from the research expenditure. There was a tendency occasionally for various aspects of the multi-national programmes to be justified on the ground of their training content. There are dangers here and we feel that, while exchanges of scientists and other such activities are very important, the participation in the research programme should depend on the capacity to contribute to the results of that programme rather than on hypothetical future gains. Training and development by sharing facilities with those from other countries is obviously important and should have a clear programme. We make some more detailed recommendations in Recommendations 11-15.

Chapter 6

We have discussed above the valuable part played by the CGC in the process and we make certain recommendations to do with that and particularly about a perceived problem with the participation in the whole programme of smaller and perhaps less orthodox research units and

in the danger of the perception that in some mysterious way the CGC could become a sort of club from which the smaller or less established units could feel excluded. We do not think that this is so but, since it is a perception held by a number of people, it should be addressed if possible, either by additional membership of the CGC and/or by rotation or a fixed term of appointment to that body. We have already referred to criticisms about some of the accountancy procedures and, though this might seem a relatively small matter, it has serious consequences. Problems of staff morale, problems of retaining staff with particular expertise, including quite junior staff, are very great if there are significant payment delays, particularly to smaller units. This is referred to in the Chapter and is reflected in Recommendation 25.

RECOMMENDATIONS

General

1. The present programme is effective and we recommend its continuance to at least its present level of support. The present management of the programme is successful but the load on Commission staff should, we recommend, be reduced.

2. There has been a considerable loss of public confidence in science and scientists over the past two decades. It is hard to see how this can be addressed by the programme other than by continuing to produce sound scientific work. However, we feel that this is so important that the attention of other Directorates should be drawn to the need for a strong programme of public information, research and education, to attempt to address the present incomprehension and fear about radiation risks. Particular attention should be paid to the education of groups, such as general medical practitioners who may have the most significant effect on public perception and understanding and whose basic comprehension may be low.

3. There should be a system of rotation for members of those serving on the CGC and, in particular, consideration should be given to how smaller research organisations should be more positively represented.

Research

4. Biological dosimetry research should continue to be treated as a priority area.

5. A strong base of fundamental research must be sustained to provide the foundation to undergird the broad range of applied research needs.

6. Particular importance is attached to studies of the effects of low doses and low dose rates and the significance of such studies for public policy and understanding.

7. Continued close interaction with the United States' effort to develop a radiobiology database is strongly endorsed.

8. Initiatives must be exercised to ensure that molecular biology insights and technology is applied to radiation protection research.

9. Further efforts to accomplish pooling of epidemiological data are highly encouraged to improve the statistical power of the research. Small scale studies of inadequate power should be discouraged.

10. One field in which there is a difficult conflict of evidence and interpretation is that of the possible health consequences of radon exposures. We recommend that a high priority be given to this part of the programme.

Training

11. Separate funding arrangements for training should be identified. The need to provide a regular intake of able scientists to the radiological protection field was stressed by previous evaluations and we would confirm their concern. Our report shows that much has been done but this must be a continuing and probably increasing effort. There should be a clearly defined training budget (not part of the research budget) and a training management structure involving staff and member states which is visible and active. Activities as part of the research programme should not be confused with these operations.

12. Education and training activities of the EC should be harmonised with similar activities of other international organisations and scientific bodies (e.g. IAEA, ILO, WHO, IRPA), in respect of both the teaching materials and the target groups.

13. The possibility of issuing a certificate on successful participation in an organised training course, which would have a European-wide recognition, seems to be a pressing need already. This should be referred as a matter of urgency to the new training management structure recommended above.

14. More emphasis should be given to training courses organised for senior scientists (teaching of teachers) and letting the national organisations convey the knowledge so obtained to the individual users or to the radiation protection practitioners.

15. Full use should be made of arrangements for bursaries to encourage attendance at recognised training courses run by national authorities. There should be a registry of such courses maintained by the EC.

Programme Management

16. The use of Association Agreements should be extended.

17. We support the proposals for clarification of the role of co-ordinators and for fuller interaction in certain aspects of the programme between the co-ordinators themselves.

18. While supporting enthusiastically the value of multi-national projects, we would like to see that talented individual academics who might not fit easily into such schemes should be able to look for and, where appropriate, find support.

19. We recommend the continued support for EULEP, EURADOS and IUR and their role in the generation of collaborating teams.

Collaboration

20. Studies of contamination and of human over-exposures should not be limited to or dominated by the consequences of the Chernobyl accident. Earlier incidents of various kinds should also be the subject of such study since material of enormous value must be available. Extra attention should be paid to assessment and treatment of acute radiation syndrome and other non-stochastic effects.

21. The exchange of scientists between the CIS and the EU should be supported.

22. The post-Chernobyl part of the programme and the PECO actions should be separately evaluated in a year or two once significant results can be presented.

23. Increased attention should be paid to studies of the psycho-social consequences of measures such as sheltering and evacuation following environmental contamination. Studies of this nature will help in the judgement of cost-benefit considerations associated with such measures.

Administration and Funding

24. The level of support for individual projects should not be lowered. While recognising the need for financial stringency, we consider the present extent of the programme to be the minimum necessary for viability and that simply reducing the amount given to individual projects in order to support more projects would not be the correct way forward.

25. Ways must be sought to limit the delays in formulating and starting projects.

26. We repeat previous recommendations about the need to strengthen links between the radiation protection programme and other research units in DGXII and other Directorates General. This may require a somewhat more formal mechanism than exists at present.

27. The peer review system should be looked at to ensure, as far as possible, transparency, and to allow accessibility to the programme of smaller research units and innovative and less orthodox scientific approaches. This recommendation reflects an unfulfilled recommendation of a previous panel.

28. Continuing attention should be paid to bringing the results of research activities to the notice of those concerned with standard setting. Links with DGXI must be firmer and more formalised. It should be considered whether there should be a formal requirement to consult as part of Article 31 procedures and to record that such consultation has taken place.

29. Close interaction with the United States Department of Energy's (DOE) research programme in radiation dosimetry and instrumentation is urged, particularly during the current period of apparent reassessment of priorities by DOE's Health and Environment Research Programme Management.

30. Interaction with other research programmes outside the European Union should also be continued and developed.

RESUMÉ

Panelets opgaver beskrives kort i kapitel 1. Panelets undersøgelser fremstilles i enkeltheder i de følgende kapitler, og de særlige henstillinger følger efter dette resumé. De generelle konklusioner kan imidlertid opsummeres således:

- 1990-1922-programmet har stadig udviklet sig tilfredsstillende, på nogle områder har udviklingen endda været fremragende. Det er blevet tilpasset til ændrede behov og øget viden og har vist sig at skabe motivation og værdifulde forskningsresultater.

- Der er sket en mærkbar ændring i den holdning, som præger programmet, navnlig når det drejer sig om multinationale kontrakter og undersøgelser i forbindelse med arbejde i østeuropæiske lande, og når det gælder forbindelser til forskningsprogrammer uden for EU.

- Programmet bliver effektivt ledet. Muligheden for at benytte rådgivende eksperter bliver ikke udnyttet fuldt ud, f.eks. ved gennemgang af forskningsforslag, men begrænser sig hovedsageligt til, at nogle få eksperter indrulleres i det rådgivende udvalg for forvaltning og koordination.

- Der er behov for stadig at være på vagt for at sikre, at der tages hensyn til forskningsresultaterne, når EU's sociale og lovgivningsmæssige politik fastlægges. Nogle af dette områdes organisatoriske aspekter indgår i henstillingerne.

- Der er også behov for at gøre administrationen og den finansielle tilrettelæggelse bag programmet hurtigere og mere brugervenlig.

De mere udførlige bemærkninger findes i de følgende kapitler og omfatter bl.a.:

Kapitel 3

Vægtfordelingen i programmet har varieret en smule med tiden, og vi har fremsat henstillinger om et eller to områder, hvor en højere prioritet ville være passende. Navnlig akutte strålingsskader og betydningen af ikke-erhvervsmæssig udsættelse for radon kan fremhæves som områder af særlig interesse.

Det er vigtigt, at de tragiske og dramatiske begivenheder i Tjernobyl ikke kommer til at dominere diskussionen om strålingsbeskyttelse. Vi gør opmærksom på, at langt mindre iøjefaldende hændelser, som f.eks. bortkomne eller stjålne strålingskilder har forårsaget langt mere omfattende skade og langt flere dødsfald end reaktorer og reaktoruheld. Det er også vigtigt at erkende, at forskningen i strålingsbeskyttelse har langt større betydning for samfundet (medicin, miljøproblemer i forbindelse med radon osv.) end snævre sikkerheds- og sundhedshensyn i forbindelse med drift af kernekraftværker.

Den stærkt udvidede brug af multinationale kontrakter har betydet meget hårdt arbejde for Kommissionens personale og koordinatorerne, og vi kan derfor kun glæde os over de bestræbelser, som er i gang for at klarlægge koordinatorernes opgave. Støtte og vejledning fra Det Rådgivende Udvalg for Forvaltning og Koordination er stadig afgørende, og vi har fremsat bemærkninger herom og om andre sider af programmet i henstilling 16-30.

Henstilling 2 og 23 er udtryk for vor bekymring over, at den nuværende situation trods mange års vellykket forskning og trods mange forsøg på at forbedre offentlighedens opfattelse og forståelse, må betragtes som utilfredsstillende, og det kan meget vel tænkes, at der skal benyttes anderledes psykosociale fremgangsmåder og kommunikationsmetoder. Dette problem ligger imidlertid uden for den egentlige strålingsbeskyttelse og hører ind under det generelle spørgsmål om almindelig skepsis og mangel på tillid til avanceret videnskab og teknologi.

Kapitel 4

Udarbejdelsen af post-Tjernobyl-programmet og PECO-programmet har været både vigtig og betydningsfuld. Udvekslingen af videnskabsmænd mellem SNG og EU har vor fulde støtte, og programmerne ser ud til at udvikle sig tilfredsstillende. På nuværende tidspunkt foreligger der imidlertid ikke tilstrækkelige resultater til, at vi kan vurdere dette arbejde effektivt. Vi anbefaler derfor, at dette område vurderes yderligere om et eller to år, når der foreligger tilstrækkelige resultater og tilstrækkeligt rapportmateriale. Det fremtidige arbejde inden for post-Tjernobyl-programmet kræver stærk integration, ikke blot inden for de enkelte projekter, men også mellem projektgrupperne. Det blev stærkt tilkendegivet over for os, at der arbejdes intenst med dette spørgsmål.

Kapitel 5

Vi har lagt særlig vægt på uddannelse, ligesom tidligere rapporter også har gjort det. Vekselvirkningen mellem nationale uddannelsesprogrammer og fællesskabsaktiviteter er vigtig, og vi finder, at der på dette område er behov for en stærk koordination ved hjælp af en klart defineret mekanisme. Måske burde det have en stærkere publicitetsprofil, og uddannelsesbudgettet bør i hvert fald holdes skarpt adskilt fra forskningsudgifterne. Der har været en tendens til, at nogle sider af de multinationale programmer lejlighedsvis er blevet begrundet med deres uddannelsesværdi. Her ligger der en fare, og vi mener, at udveksling af videnskabsmænd og lignende aktiviteter ganske vist er meget vigtige, men at deltagelse i forskningsprogrammer snarere bør afhænge af muligheden for at bidrage til det pågældende programs resultater end af et hypotetisk fremtidigt udbytte. Det er indlysende, at uddannelse og udvikling, som foregår ved, at anlæg og faciliteter deles med andre lande, er vigtig og burde omfattes af et klart program. Vi fremsætter mere udførlige henstillinger i henstilling 11-15.

Kapitel 6

Vi har allerede nævnt den værdifulde rolle, som Det Rådgivende Udvalg for Forvaltning og Koordination spiller i processen, og vi fremsætter visse henstillinger herom, ikke mindst om et problem i forbindelse med små og måske mindre traditionelle forskningsenheders deltagelse i hele programforløbet programmer og faren ved den opfattelse, at Det Rådgivende Udvalg for Forvaltning og Koordination på en eller anden

mystisk måde udvikler sig til en slags klub, som små og mindre veletablerede enheder føler sig udelukket fra. Vi mener ikke, at denne opfattelse er rigtig, men da den er ret udbredt, bør der gøres noget ved den, enten ved yderligere medlemskab af Det Rådgivende Udvalg for Forvaltning og Koordination og/eller rotation eller tidsbegrænset udnævnelse. Vi har allerede omtalt kritikken af nogle af regnskabsprocedurerne, og selvom dette spørgsmål kan synes forholdsvis ubetydeligt, kan det få alvorlige følger. Problemerne med de ansattes motivation, problemerne med at fastholde ansatte med særlig sagkundskab, heriblandt helt unge medarbejdere, er meget store, hvis der forekommer betydelige lønforsinkelser, især i små enheder. Disse spørgsmål behandles i kapitlet og omtales i henstilling 25.

HENSTILLINGER

Generelt

1. Det nuværende program er effektivt, og vi henstiller, at det videreføres med i hvert fald den nuværende støtte. Den nuværende ledelse er udmærket, men vi anbefaler, at Kommissionens personale får arbejdsbyrden nedskåret.

2. I løbet af de sidste 20 år har offentligheden i høj grad mistet sin tillid til videnskaben og forskerne. Det er vanskeligt at se, hvad programmet kan stille op med dette problem ud over fortsat at levere gedigent videnskabeligt arbejde. Vi føler imidlertid, at spørgsmålet er så vigtigt, at de øvrige direktorater bør gøres opmærksomme på behovet for et effektivt program for offentlig oplysning og uddannelse for at modvirke den frygt og mangel på forståelse, der nu præger den almindelige opfattelse af strålingsproblemer. Der bør især lægges vægt på uddannelse af grupper, som f.eks. praktiserende læger, der har den mest direkte indflydelse på den offentlige bevidsthed, og hvis grundlæggende forståelse af problemerne måske ikke er alt for stor.

3. Der bør være en rotationsordning for medlemmerne i Det Rådgivende Udvalg for Forvaltning og Koordination, og det bør navnlig tages i betragtning, hvorledes de små forskningsinstitutter kan repræsenteres på en mere positiv måde.

Forskning

4. Forskningen i biologisk dosimetri bør videreføres og betragtes som et prioriteret område.

5. Grundforskningen bør stadig være stærkt repræsenteret som grundlag og støtte for et bredt spektrum af behov for anvendt forskning.

6. Der bør lægges særlig vægt på undersøgelser af lavdosisvirkninger og lavdosishastigheder og disse undersøgelsers betydning for offentlig politik og offentlig forståelse.

7. Fortsat snævert samarbejde med USA's bestræbelser på at udvikle en strålingsbiologisk database anbefales stærkt.

8. Der må træffes initiativer for at sikre, at molekylærbiologisk viden og teknologi udnyttes i forbindelse med forskning i strålingsbeskyttelse.

9. Der tilskyndes stærkt til at foretage yderligere bestræbelser på at færdiggøre indsamlingen af epidemiologiske data for at forbedre forskningens statistiske vægt. Mindre undersøgelser med utilstrækkelig vægt bør ikke opmuntres.

10. Et område, som vanskeliggøres af modstridende vidnesbyrd og fortolkninger, er de eventuelle sundhedsmæssige følger af udsættelse for radon. Vi anbefaler, at denne del af programmet får en høj prioritet.

Uddannelse

11. Der bør indføres særlige finansieringsordninger for uddannelse. Behovet for at skaffe regelmæssig tilgang af kompetente videnskabsmænd til forskningsområdet strålingsbeskyttelse er blevet betonet i tidligere vurderinger, som vi kun kan tilslutte os. Vor egen rapport viser, at meget allerede er blevet gjort, men at bestræbelserne må videreføres og sandsynligvis intensiveres. Der bør være et klart uddannelsesbudget (som ikke indgår i forskningsbudgettet), og uddannelsens ledelsesstruktur bør være klar og aktivt inddrage personale og medlemsstater. Aktiviteter, der indgår i forskningsprogrammet, bør ikke sammenblandes med forskningsaktiviteter.

12. KEF's uddannelsesaktiviteter bør harmoniseres med lignende aktiviteter, som udføres af andre internationale organisationer og forskningsorganer (f.eks. IAEA, ILO, WHO og IRPA), både når det gælder undervisningsmateriale og målgrupper.

13. Muligheden for at kunne udstede et bevis på vellykket deltagelse i et uddannelseskursus, som er anerkendt på europæisk plan, synes allerede at være et presserende behov. Spørgsmålet bør behandles som hastesag af den ovenfor omtalte nye ledelsesstruktur for uddannelse.

14. Der bør lægges større vægt på uddannelseskurser for ledende forskere (undervisning til undervisere) og på at få de nationale institutter til at videregive den viden, der opnås herved, til enkelte brugere eller personer, der beskæftiger sig med strålingsbeskyttelse i praksis.

15. Mulighederne for stipendieordninger bør udnyttes fuldt ud for at tilskynde til deltagelse i anerkendte uddannelseskurser, som tilrettelægges af nationale myndigheder. EU bør føre en fortegnelse over sådanne kurser.

Programledelse

16. Brugen af associeringsaftaler bør udvides.

17. Vi støtter forslaget om at klarlægge koordinatorernes rolle og om større vekselvirkning mellem koordinatorerne, når det gælder visse sider af programmet.

18. Vi kan uforbeholdent støtte værdien af multinationale projekter, men vi så gerne,

at individuelle, talentfulde akademikere, der ikke uden videre passer ind i sådanne mønstre, i relevante tilfælde kunne søge støtte og få den.

19. Vi anbefaler fortsat støtte til EULEP, EURADOS og IUR og deres rolle, når det drejer sig om at etablere samarbejdshold.

Samarbejde

20. Undersøgelserne af kontamination og udsættelse for overdoser bør hverken begrænses til eller domineres af følgerne af Tjernobyl-ulykken. Tidligere ulykker af forskellig slags bør også undersøges, da der må foreligge et materiale af enorm værdi. Der bør lægges ekstra vægt på vurdering og behandling af akut strålingssyndrom og andre ikke-stokastiske virkninger.

21. Udvekslingen af forskere mellem SNG og EU bør støttes.

22. Programmets post-Tjernobyl-afsnit og PECO-aktionerne bør vurderes hver for sig i løbet af et eller to år, når der kan forelægges afgørende resultater.

23. Der bør lægges øget vægt på at undersøge de psykosociale følger af foranstaltninger som beskyttelse og evakuering i forbindelse med miljøkontaminering. Ved hjælp af sådanne undersøgelser vil rentabilitetsovervejelserne i forbindelse med disse foranstaltninger kunne bedømmes.

Administration og finansiering

24. Støtten til de enkelte projekter bør ikke sættes ned. Vi anerkender behovet for en stram økonomisk styring, men mener samtidig, at programmets nuværende omfang svarer til det minimum, dets bæredygtighed kræver, og at man ikke går den rette vej ved at nedskære beløbene til de enkelte projekter for at kunne give støtte til flere projekter.

25. Forsinkelserne i forbindelse med projekternes formulering og iværksættelse må søges begrænses.

26. Vi gentager tidligere henstillinger om behovet for at styrke forbindelserne mellem strålingsbeskyttelsesprogrammet og andre forskningsenheder under GD XII og de øvrige generaldirektorater. Det kræver muligvis en lidt mere formel mekanisme end den nuværende.

27. Den ordning, hvorefter man lader ligemænd foretage en bedømmelse, bør tages op til behandling for at sikre, at der så vidt muligt er gennemsigtighed, og at små forskningsenheder og innovative og mindre traditionelle videnskabelige metoder kan få adgang til programmet. Denne henstilling afspejler en henstilling, som blev fremsat af et tidligere panel, men ikke taget til følge.

28. Der bør fortsat lægges vægt på, at forskningsaktiviteternes resultater viderebringes til dem, der beskæftiger sig med udarbejdelse af standarder. Forbindelserne med GD XI skal styrkes og normaliseres. Det bør overvejes, om der bør være et

formelt krav om samråd som led i artikel 31-procedurerne og om at registre, at et sådant samråd har fundet sted.

29. Der tilskyndes til snæver vekselvirkning med det forskningsprogram for strålingsdosimetri og -instrumentering, som udføres af USA's energiministerium, især i den nuværende periode, hvor det amerikanske energiministeriums program for sundheds- og miljøforskning er blevet taget op til fornyet vurdering.

30. Også samarbejdet med andre forskningsprogrammer uden for Den Europæiske Union bør videreføres og udvikles.

Zusammenfassung und Empfehlungen

Das Mandat des Gutachterausschusses ist kurz in Kapitel 1 beschrieben. Genauere Angaben zu den einzelnen Untersuchungen des Ausschusses sind in den folgenden Kapiteln enthalten; im Anschluß an diese Zusammenfassung werden die einzelnen Empfehlungen genannt. Die allgemeinen Schlußfolgerungen lassen sich wie folgt zusammenfassen:

- Das Programm 1990 - 1992 macht weiterhin zufriedenstellende und in einigen Bereichen sogar hervorragende Fortschritte. Es konnte den sich ändernden Bedürfnissen und dem steigenden Wissen angepaßt werden, hat sich als gut durchdacht erwiesen und wertvolle Forschungsergebnisse geliefert.

- Das Programmkonzept wurde in einigen Punkten erheblich verändert. Diese Änderungen betreffen insbesondere die Ausarbeitung multinationaler Verträge, die Ausdehnung des Programms auf Studien, die im Zusammenhang mit der Arbeit in den osteuropäischen Ländern stehen und die Herstellung von Kontakten zu außerhalb der EU durchgeführten Forschungsprogrammen.

- Das Programm wird effizient durchgeführt. Der Einsatz von beratenden Sachverständigen, z. B. bei der Überprüfung von Forschungsvorschlägen, wird nicht übermäßig in Anpruch genommen. Ihr Einsatz beschränkt sich hauptsächlich auf die Mitarbeit weniger Sachverständiger im BVKA.

- Ständige Aufmerksamkeit ist erforderlich, damit die Forschungsergebnisse vollständig bei der Sozial- und Gesetzgebungspolitik der EU berücksichtigt werden. Einige organisatorische Aspekte dieses Bereichs werden in den Empfehlungen aufgegriffen.

- Die mit dem Programm verbundene Verwaltung und finanzielle Organisation muß flexibler und "benutzerfreundlicher" werden.

Einzelne Bemerkungen werden in den folgenden Kapitels genauer ausgeführt und umfassen:

Kapitel 3

Die Schwerpunkte des Programms haben sich im Laufe der Zeit leicht verschoben, und unsere Empfehlungen betreffen ein oder zwei Bereiche, für die eine höhere Priorität angebracht scheint. Bei diesen Gebieten mit besonderer Bedeutung handelt es sich unserer Ansicht nach vor allem um akute Strahlenschäden und die Bedeutung nicht-berufsbedingter Radonexposition.

Die Diskussion auf dem Gebiet des Strahlenschutzes sollte keineswegs ausschließlich durch die tragischen und dramatischen Ereignisse in Tschernobyl bestimmt werden. Vielmehr möchten wir darauf aufmerksam machen, daß mehr Krankheiten und Todesfälle auf weniger spektakuläre Vorfälle wie den Verlust oder den Diebstahl etc. von Strahlenquellen zurückzuführen sind als auf den Betrieb von Kernreaktoren oder damit verbundene Störfälle. Ebenfalls sollte erkannt werden, daß die Strahlenschutzforschung in vielen Bereichen für die Gesellschaft von Interesse ist (Bedenken gegen Radon aus medizinischer und ökologischer Sicht) und über den begrenzten Bereich der Sicherheits- und Gesundheitsfragen im Zusammenhang mit der Kernindustrie hinausgehen.

Die steigende Zahl multinationaler Verträge bedeutete für die Dienststellen der Kommission und die Koordinatoren einen erheblichen Arbeitsaufwand, und wir begrüßen das gegenwärtige Bemühen um eine genaue Festlegung der Aufgaben der Koordinatoren. Die Unterstützung und Leitung durch den BVKA ist nach wie vor äußerst wichtig, und wir haben hierzu und

zu anderen Aspekten des Programms in den Empfehlungen 16 bis 30 Stellung genommen.

Die Empfehlungen 2 und 23 spiegeln unsere Betroffenheit darüber wider, daß trotz jahrelanger erfolgreicher Forschungen und Studien und trotz zahlreicher Versuche, das Verständnis der Öffentlichkeit zu fördern, die derzeitige Sitution nicht als zufriedenstellend betrachtet werden kann. Es stellt sich die Frage, ob nicht eventuell andere psychosoziale oder kommunikationswissenschaftliche Konzepte angewandt werden sollten. Dieses Problem geht über das Gebiet des Strahlenschutzes hinaus und fällt unter die Problematik der Vorbehalte und des mangelnden Vertrauens der Öffentlichkeit in die moderne Wissenschaft und Technologie im allgemeinen.

Kapitel 4

Die Ausarbeitung des Post-Tschernobyl- und des PECO-Programms war äußerst bedeutsam. Der Austausch von Wissenschaftlern zwischen der GUS und der EU findet unsere volle Unterstützung, und die Programme scheinen sich zufriedenstellend zu entwickeln. Zur Zeit stehen uns jedoch nicht genügend Ergebnisse zur Verfügung, um eine umfassende Bewertung dieser Arbeit vornehmen zu können. Wir schlagen eine Bewertung in ein oder zwei Jahren vor, da dann die erforderlichen Ergebnisse und Berichte vorliegen müßten. Die zukünftige Arbeit im Rahmen des Post-Tschernobyl-Programms wird nicht nur eine stärkere Integration innerhalb der Einzelprojekte sondern auch zwischen den Projektgruppen erfordern; vieles weist darauf hin, daß an diesem Punkt intensiv gearbeitet wird.

Kapitel 5

Wie bereits in den vorhergehenden Berichten wird der Ausbildung in diesem Bericht besondere Beachtung geschenkt. Die Wechselwirkung zwischen einzelstaatlichen Ausbildungsprogrammen und Gemeinschaftmaßnahmen ist nicht zu vernachlässigen, woraus die Notwendigkeit einer engen Zusammenarbeit auf diesem Gebiet durch klar definierte Mechanismen erwächst. Eventuell sollte hierfür mehr Unterstützung durch Werbemaßnahmen gewährt werden. Außerdem sollten die Finanzmittel für die Ausbildung auf jeden Fall klar von den Forschungsausgaben getrennt werden. Gelegentlich gab es Tendenzen, einzelne Punkte der multinationalen Programme durch ihren Ausbildungsinhalt zu begründen. Hierin sehen wir eine Gefahr und sind der Meinung, daß der Austausch von Wissenschaftlern und andere ähnliche Maßnahmen zwar äußerst wichtig sind, die Teilnahme am Forschungsprogramm jedoch eher von dem möglichen Beitrag zu den Ergebnissen des Programmes als von einem hypothetischen zukünftigen Nutzen abhängen sollte. Die Bedeutung von Ausbildung und Entwicklung durch die gemeinsame Nutzung von Einrichtungen zusammen mit Wissenschaftlern anderer Länder ist unbestritten und sollte systematisch angegangen werden. Detailliertere Vorschläge hierzu sind in den Empfehlungen 11 - 15 enthalten.

Kapitel 6

Auf die wichtige Rolle des BVKA bei der Durchführung des Programms wurde bereits hingewiesen. Einige Empfehlungen beziehen sich hierauf, insbesondere auf das Problem der Teilnahme von kleineren und evtl. unorthodoxer arbeitenden Forschungseinheiten am gesamten Programm sowie auf die Gefahr, daß der Eindruck entstehen könnte, der BVKA entwickle sich auf mysteriöse Weise zu einer Art Klub, von dem sich die kleineren und weniger etablierten Einheiten ausgeschlossen fühlen könnten. Wir sind nicht der Ansicht, daß dies der Fall ist. Diesem weit verbreiteten Eindruck sollte jedoch möglichst durch Aufnahme zusätzlicher Mitglieder und/oder Rotation bzw. zeitlich befristeter Ernennung in dieses Gremium entgegengewirkt werden. Die an der Buchhaltung geäußerte Kritik wurde bereits erwähnt. Obwohl diese Angelegenheit als nebensächlich betrachtet werden könnte, hat sie ernstzunehmende Auswirkungen. Es gibt erhebliche Probleme bei der Mitarbeitermotivation

und der Beschäftigung von Personal mit einem speziellen Sachwissen einschließlich junger Mitarbeiter, wenn größere Zahlungsrückstände - insbesondere für kleinere Einheiten - bestehen. Dieses Problem wird in dem entsprechenden Kapitel und in Empfehlung 25 angesprochen.

EMPFEHLUNGEN

Im allgemeinen

1. Das laufende Programm ist erfolgreich und wir empfehlen seine Fortsetzung, solange zumindest die derzeitige Unterstützung gewährt werden kann. Die derzeitige Durchführung des Programms ist erfolgreich, wir schlagen jedoch vor, die Arbeitsbelastung für die Dienststellen der Kommission zu senken.

2. Während der letzten zwei Jahrzehnte war ein erheblicher Vertrauensverlust der Öffentlichkeit in die Wissenschaft und Wissenschaftler festzustellen. Dieser Tendenz kann das Programm vermutlich nur durch kontinuierlich fundierte wissenschaftliche Arbeit entgegenwirken. Wir halten dieses Problem jedoch für so wichtig, daß anderer Generaldirektionen darauf aufmerksam gemacht werden sollten, wie notwendig ein umfassendes Programm zur Information der Öffentlichkeit, Forschung und Ausbildung ist, um dem mangelnden Verständnis und der Besorgnis über Strahlengefahren gerecht zu werden. Besondere Beachtung sollte der Ausbildung von Gruppen wie Ärzten geschenkt werden, die vermutlich einen ganz erheblichen Einfluß auf die Meinung und das Verständnis der Öffentlichkeit haben, jedoch zuweilen vielleicht ein zu geringes Grundwissen haben.

3. Für die Mitgliedschaft im BVKA sollte ein Rotationssystem eingerichtet werden. Insbesondere sollten Überlegungen im Hinblick auf eine stärkere Vertretung kleinerer Forschungseinrichtungen angestellt werden.

Forschung

4. Die biologische Dosimetrie sollte nach wie vor ein Schwerpunkt der Forschung sein.

5. Eine intensiv betriebene Grundlagenforschung muß das Fundament für die große Aufgabenvielfalt der angewandten Forschung bieten.

6. Besonderer Nachdruck wird auf die Untersuchungen über die Auswirkungen niedriger Dosen und niedriger Dosisleistungen und auf die Bedeutung solcher Untersuchungen für die Haltung und das Verständnis der Öffentlichkeit gelegt.

7. Die Fortsetzung der engen Zusammenarbeit mit den USA bei den Bemühungen, eine Datenbank für Radiobiologie zu entwickeln, wird nachdrücklich befürwortet.

8. Es sollte darauf hingearbeitet werden, daß die Erkenntnisse der Molekularbiologie und der Technologie in die Strahlenschutzforschung einbezogen werden.

9. Weitere Maßnahmen zur Vervollständigung der epidemiologischen Datensammlung sind äußerst wünschenswert, um die Forschungsleistung in statistischer Hinsicht zu verbessern. Wenig ertragreiche kleinere Untersuchungen sollten vermieden werden.

10. Hinsichtlich der möglichen Auswirkungen einer Radonexposition auf die Gesundheit besteht ein schwer zu lösender Konflikt zwischen Tatsachen und ihrer Interpretation. Wir empfehlen, diesem Teil des Programms hohe Priorität einzuräumen.

Ausbildung

11. Für die Ausbildung sollte ein getrenntes Finanzierungssystem eingerichtet werden. Die Notwendigkeit, regelmäßig fähige Wissenschaftler für den Strahlenschutz zu gewinnen, wurde bereits durch frühere Bewertungen hervorgehoben, denen wir uns anschließen. Aus unserem Bericht geht hervor, daß bisher viel geleistet wurde, in diesem Fall jedoch kontinuierliche und vermutlich stärkere Bemühungen erforderlich sind. Ein klar definiertes Ausbildungsbudget (das unabhängig vom Forschungsbudget ist) und eine transparente und leistungsfähige Verwaltungsstruktur für die Ausbildung aus Mitarbeitern und Mitgliedstaaten sollten vorhanden sein. Im Rahmen des Forschungsprogramms durchgeführte Maßnahmen sollten klar von diesen Schritten getrennt werden.

12. Die Ausbildungsmaßnahmen der KEG sollten mit ähnlichen Maßnahmen anderer internationaler Organisationen und wissenschaftlicher Gremien (z. B. IAEA, ILO, WHO, IRPA) im Hinblick auf die Unterrichtsmaterialien und Zielgruppen abgestimmt werden.

13. Die Ausstellung einer Bescheinigung über die erfolgreiche Teilnahme an einem in ganz Europa anerkannten Ausbildungslehrgang ist bereits jetzt dringend notwendig. Dies sollte als dringende Angelegenheit der gemäß unserer obigen Empfehlung neu zu bildenden Ausbildungsverwaltung vorgelegt werden.

14. Den Ausbildungslehrgängen für Wissenschaftler in leitender Funktion (Unterricht für Lehrkräfte) und der Weitergabe des so erworbenen Wissens durch die nationalen Stellen an die Einzelanwender bzw. an die Strahlenschutzpraktiker sollte größere Bedeutung zukommen.

15. Die Möglichkeit der Vergabe von Stipendien zur Förderung der Teilnahme an anerkannten Ausbildungslehrgängen, die von den nationalen Behörden veranstaltet werden, sollte voll genutzt werden. Ein Verzeichnis dieser Lehrgänge sollte durch die EU geführt werden.

Durchführung des Programms

16. Der Abschluß von Assoziierungsabkommen sollte ausgeweitet werden.

17. Wir untersüzten die Vorschläge für die eindeutige Festlegung der Aufgaben der Koordinatoren und für ihre engere Zusammenarbeit bei bestimmten Programmpunkten.

18. Während wir einerseits den Wert von multinationalen Projekten hoch schätzen, möchten wir andererseits begabten einzelnen Wissenschaftlern, die nicht ohne weiteres in solche Systeme passen, die Möglichkeit geben, sich um Unterstützung zu bemühen und sie ggf. zu erhalten.

19. Wir empfehlen die weitere Förderung von EULEP, EURADOS und IUR und weisen auf ihre Funktion bei der Bildung von Kooperationsteams hin.

Zusammenarbeit

20. Untersuchungen zur Kontamination und Personendosisüberschreitung sollten sich nicht ausschließlich auf die Auswirkungen des Störfalls in Tschernobyl beschränken und durch sie bestimmt werden. Frühere Vorfälle verschiedenster Art sollten ebenfalls bei den Untersuchungen berücksichtigt werden, da aussagekräftiges

Material vorliegen muß. Besondere Aufmerksamkeit sollte auf die Bewertung und Behandlung des akuten Strahlensyndroms und anderer nicht-stochastische Strahlenwirkungen verwandt werden.

21. Der Austausch von Wissenschaftlern zwischen der GUS und der EU sollte gefördert werden.

22. Der Post-Tschernobyl-Teil des Programms und die PECO-Aktionen sollten nach ein oder zwei Jahren, wenn aussagekräftige Ergebnisse vorliegen, getrennt bewertet werden.

23. Größere Beachtung sollte Untersuchungen zu den psychosozialen Auswirkungen von Maßnahmen wie der Verbringung in Schutzräume oder der Evakuierung nach einer Kontamination der Umwelt zukommen. Untersuchungen dieser Art bieten eine Entscheidungshilfe bei der Kosten-Nutzen-Analyse dieser Maßnahmen.

Verwaltung und Finanzierung

24. Die Förderung von Einzelprojekten sollte nicht eingeschränkt werden. Trotz der finanziellen Zwänge sind wir der Ansicht, daß der derzeitige Umfang des Programms dem Minimum entspricht, das für die erfolgreiche Durchführung erforderlich ist. Die Kürzung der Mittel für die einzelnen Projekte, um dadurch eine größere Anzahl von Vorhaben fördern zu können, erscheint uns nicht als der richtige Weg.

25. Es muß über Wege und Mittel nachgedacht werden, um die Verzögerungen bei der Festlegung und dem Anlaufen von Projekten zu begrenzen.

26. Wir greifen erneut frühere Empfehlungen hinsichtlich einer notwendigen Stärkung der Beziehungen zwischen dem Strahlenschutzprogramm und anderen Forschungsgruppen in der GD XII sowie anderen Generaldirektionen auf. Hierdurch könnte eine etwas stärker formalisierte Vorgehensweise erforderlich werden.

27. Das System der Überprüfung durch Gutachter sollte nochmals im Hinblick darauf untersucht werden, daß eine größtmögliche Transparenz gewährleistet wird, kleineren Forschungseinrichtungen der Zugang zum Programm ermöglicht wird und innovative und unorthodoxere wissenschaftliche Konzepte berücksichtigt werden können. Diese Empfehlung entspricht der bisher unerfüllten Forderung eines früheren Gutachterausschusses.

28. Es sollte auch weiterhin darauf geachtet werden, die Ergebnisse der Forschungsarbeiten den mit der Ausarbeitung von Normen beauftragten Stellen zuzuleiten. Die Beziehungen zur GD XI müssen enger und stärker formalisiert werden. Es sollte über die Notwendigkeit einer formalen Beratungspflicht gemäß der in Artikel 31 genannten Verfahren und einer Vermerkpflicht der stattgefundenen Beratung nachgedacht werden.

29. Eine enge Zusammenarbeit mit dem Forschungsprogramm des US Department of Energy (DOE) im Bereich der Strahlungsdosimetrie und -instrumentierung ist insbesondere während der derzeitigen Neufestsetzung der Prioritäten durch die für die Verwaltung des Gesundheits- und Umweltforschungsprogramms (Health and Environment Research Programme Management) zuständige Stelle des DOE dringend erforderlich.

30. Die Zusammenarbeit mit anderen Forschungsprogrammen außerhalb der EU sollte

ebenfalls fortgesetzt und ausgeweitet werden.

RESUMEN

Las tareas del Grupo se describen brevemente en el Capítulo 1. El examen detallado realizado por el Grupo aparece, a continuación, en los capítulos correspondientes, y este resumen va seguido de unas recomendaciones específicas. Pueden, sin embargo, resumirse las conclusiones generales:

- El programa 1990-1992 ha seguido avanzando de forma satisfactoria, y en algunas áreas se han producido avances sobresalientes. El programa se ha adaptado a las necesidades cambiantes y a la ampliación de los conocimientos y ha demostrado una buena motivación, produciendo resultados de investigación valiosos.

- Se han producido cambios notables en el planteamiento del programa, en particular en el desarrollo de los contratos multinacionales, y la ampliación a estudios relacionados con los países de Europa oriental, y en cuanto al establecimiento de vínculos con programas de investigación fuera de los Estados de la UE.

- El programa se gestiona de forma eficaz. El recurso a consultores expertos no se explota ampliamente, por ejemplo en lo que respecta a la revisión entre pares de las propuestas de investigación, sino que se limita principalmente a la intervención de unos pocos en el CGC.

- Se hace necesaria una vigilancia continua para garantizar que los resultados de la investigación se tengan plenamente en cuenta a la hora de desarrollar las políticas sociales y legislativas de la UE. En las Recomendaciones se recogen algunos de los aspectos de organización de esta área.

- Continúa la necesidad de hacer más rápida y cómoda para el usuario la organización administrativa y financiera que respalda el programa.

Los comentarios específicos se detallan en los capítulos siguientes.

Capítulo 3

El equilibrio general del programa ha experimentado algunas modificaciones a lo largo del tiempo, y hemos hecho recomendaciones sobre una o dos áreas que tienen mayor prioridad. En particular, llamamos la atención sobre las lesiones agudas por radiación y el significado de las exposiciones no profesionales al radón, como áreas de interés especial.

Es importante que los trágicos sucesos de Chernóbil no adquieran un protagonismo excesivo en los debates sobre la protección radiológica. Queremos hacer notar que ha habido más lesiones y muertes por accidentes menos espectaculares, como fuentes extraviadas o robadas, etc., que a causa de los reactores y sus desperfectos. También es importante reconocer que la investigación sobre la protección contra las radiaciones tiene unas implicaciones mucho mayores en la sociedad (relacionadas con cuestiones médicas o con las preocupaciones ambientales por el radón, etc.) que las consideraciones más

limitadas sobre seguridad y salud que se asocian con el funcionamiento de la industria nuclear.

El recurso a los contratos multinacionales, que ha experimentado un gran auge, ha supuesto una tarea laboriosa para el personal de la Comisión y para los coordinadores; nos congratulamos de las medidas que están en marcha para aclarar el cometido de estos últimos. El apoyo y la orientación por parte del CGC sigue siendo vital; nos hemos referido a este y a otros aspectos del programa en las Recomendaciones 16 a 30.

Las recomendaciones 2 y 23 reflejan nuestra preocupación en el sentido de que, a pesar de largos años de investigación y estudio fructíferos, y de muchos esfuerzos por mejorar la percepción y comprensión por parte de la opinión pública, la situación actual debe juzgarse insatisfactoria. Tal vez haya que utilizar otros planteamientos psicosociales y comunicativos. Se trata de un problema que va más allá de la protección contra las radiaciones y entra en el campo de la incertidumbre pública y de la falta de confianza en la ciencia avanzada y la tecnología en general.

Capítulo 4

Tanto el programa posterior a Chernóbil como el programa PECO han evolucionado de forma significativa. El intercambio de científicos entre la CEI y la UE cuenta con todo nuestro apoyo, y los programas parecen desarrollarse de forma satisfactoria. Sin embargo, en la actualidad no se dispone de resultados suficientes para poder evaluar eficazmente esta labor. Recomendamos que se realice una evaluación sobre este tema dentro de uno o dos años, cuando se hayan recopilado resultados e informes suficientes. Para seguir trabajando en el programa posterior a Chernóbil se requerirá una integración firme, no sólo entre los diversos proyectos, sino entre los equipos de los proyectos; se nos ha asegurado que este aspecto está teniéndose plenamente en cuenta.

Capítulo 5

Como en los informes anteriores, hemos concedido una atención particular a la formación. La interacción entre los programas nacionales de formación y las actividades comunitarias es importante, y nos parece necesaria una coordinación estrecha, a través de un mecanismo bien definido. Quizá debería tener un mayor componente público, y en cualquier caso el presupuesto destinado a la formación debería diferenciarse claramente del que se utiliza para la investigación. Ocasionalmente, algunos aspectos de los programas multinacionales se han justificado en razón de su contenido de formación. Esto comporta riesgos; nosotros opinamos que, si bien los intercambios de científicos y demás actividades de este tipo son muy importantes, la participación en el programa de investigación debería depender de la capacidad de aportar contribuciones a los resultados de dicho programa, y no de unos futuros beneficios hipotéticos. Evidentemente, la formación y el desarrollo a través de la utilización compartida de instalaciones con otros países es importante, y estas actividades deberían estar programadas convenientemente. Las recomendaciones 11-15 hacen referencia a esta cuestión.

Hemos mencionado anteriormente la valiosa contribución del CGC a este proceso, y planteamos algunos recomendaciones en relación con esto, sobre todo con referencia al problema que plantea la participación, en todo el programa, de unidades de investigación pequeñas y posiblemente menos ortodoxas, y al peligro de que se piense que, de forma misteriosa, el CGC pudiera convertirse en una especie de club del que podrían sentirse excluidas determinadas unidades pequeñas o menos asentadas. Nosotros no aceptamos que así sea, pero dado que es una opinión compartida por una serie de personas, sería necesario ocuparse de este tema, incluyendo más miembros en el CGC, y/o mediante una rotación o limitando el plazo de pertenencia a este organismo. Ya hemos hecho referencia a las críticas a algunos de los procedimientos de contabilidad; aunque esta cuestión pueda parecer relativamente insignificante, tiene consecuencias importantes. Un aplazamiento importante de los pagos, sobre todo a unidades pequeñas, puede plantear graves problemas de motivación del personal, a la hora de retener a personal con experiencia específica, incluso a personal relativamente joven. A este punto se hace referencia en el Capítulo y en la recomendación 25.

RECOMENDACIONES

Generalidades

1. El programa actual es eficaz. Recomendamos que continúe, como mínimo, con el nivel de apoyo que recibe en estos momentos. La actual gestión del programa es adecuada, pero recomendamos que se reduzca la carga que soporta el personal de la Comisión.

2. A lo largo de las últimas dos décadas, la confianza de la población en la ciencia y en los investigadores ha sufrido un declive considerable. No es fácil ver cómo el programa puede hacer frente a este hecho, salvo prosiguiendo su sólida labor científica. Ahora bien, consideramos que este punto es tan importante que debe hacerse ver a las demás Direcciones la necesidad de crear un programa dedicado a la información de la población, la investigación y la enseñanza, para atender a la actual incomprensión y a los temores a los riesgos de la radiación. Debe prestarse especial atención a la formación de grupos como los médicos generales, cuya influencia sobre la percepción y comprensión por parte de la población puede ser muy significativa, y cuyos conocimientos fundamentales pueden ser escasos.

3. Debería instaurarse un sistema de rotación para los miembros del CGC, y sobre todo se habría de considerar el tema de cómo conseguir una mayor representación de las pequeñas organizaciones de investigación.

Investigación

4. La investigación sobre dosimetría biológica debe seguir tratándose como área prioritaria.

5. Se debe mantener una investigación fundamental que proporcione una amplia base para la gran variedad de requisitos de investigación aplicada.

6. Se da especial importancia al estudio de los efectos de dosis bajas y de tasas de dosis bajas, y a las implicaciones de estos estudios en cuanto a la política y a la opinión pública.

7. Se recomienda encarecidamente seguir una estrecha cooperación con las actividades de los Estados Unidos para desarrollar una base de datos sobre radiobiología.

8. Deben tomarse iniciativas para asegurar que se apliquen a la investigación sobre protección contra las radiaciones los resultados y la tecnología de la biología molecular.

9. Se recomienda insistentemente seguir poniendo en común los datos epidemiológicos para aumentar el valor estadístico de la investigación. Debe desalentarse la realización de estudios a pequeña escala.

10. Un campo en el que las pruebas y la interpretación resultan conflictivas es el de las posibles consecuencias para la salud de la exposición al radón. Recomendamos que se dé una prioridad alta a esta parte del programa.

Formación

11. La formación debería financiarse de forma independiente. En las anteriores evaluaciones ya se insistió en la necesidad de contar con una cantera de científicos capacitados en el campo de la protección contra las radiaciones, y queremos confirmar esta preocupación. Nuestro informe muestra que ya se ha hecho mucho, pero el esfuerzo debe continuar e incluso incrementarse. Debe haber un presupuesto bien definido para la formación (que no forme parte del presupuesto de investigación) y una estructura de gestión de la formación visible y activa, en la que participen el personal y los Estados miembros. Las actividades que formen parte del programa de investigación no deben confundirse con estas operaciones.

12. Las actividades de enseñanza y formación de la CCE deben armonizarse con actividades similares de otras organizaciones internacionales y de otros organismos científicos (por ejemplo el OIEA, la OIT, la OMS y la AIPR), tanto por lo que respecta al material didáctico como a los grupos a los que va dirigida la formación.

13. La posibilidad de expedir un certificado de participación satisfactoria en un curso de formación, que estaría reconocido en toda Europa, parece ser ya una necesidad

urgente. La nueva estructura de gestión de la formación que hemos mencionado debería ocuparse lo antes posible de esta cuestión.

14. Deberá darse un mayor énfasis a los cursos de formación organizados para científicos experimentados (formación de formadores), y a la transmisión, por parte de las organizaciones internacionales, de los conocimientos obtenidos de este modo, a los usuarios individuales o a los profesionales de la protección radiológica.

15. Debería hacerse pleno uso de las becas para promover la asistencia a los cursos reconocidos de formación que organizan las autoridades nacionales. La UE debería mantener un registro de los cursos de este tipo.

Gestión del programa

16. Debería ampliarse la utilización de los Acuerdos de Asociación.

17. Apoyamos las propuestas de aclaración de la función de los coordinadores y de mayor interacción entre los propios coordinadores, en determinados aspectos del programa.

18. A la vez que insistimos en el valor de los proyectos multinacionales, nos gustaría que los investigadores con talento que tal vez no encajen fácilmente en estos proyectos puedan buscar y, en su caso, encontrar apoyo.

19. Recomendamos que se sigan respaldando EULEP, EURADOS y IUR, así como su función en la creación de equipos de colaboración.

Colaboración

20. Los estudios sobre la contaminación y la sobreexposición humana no deberían limitarse a las consecuencias del accidente de Chernóbil, y este suceso no debería siquiera tener un protagonismo excesivo. Estos estudios deben referirse también a incidentes anteriores de diversos tipos, ya que es necesario disponer de grandes cantidades de material. Se debe prestar una atención especial a la evaluación y al tratamiento del síndrome agudo de radiación y a otros efectos no estocásticos.

21. Debe apoyarse el intercambio de investigadores entre la CEI y la UE.

22. La parte del programa posterior a Chernóbil y las medidas relacionadas con los PECO deberán evaluarse de forma independiente dentro de uno o dos años, en cuanto puedan presentarse unos resultados significativos.

23. Deberá prestarse mayor atención a los estudios de las consecuencias psicosociales de medidas tales como la construcción de albergues y la evacuación tras una contaminación del medio ambiente. Los estudios de este tipo contribuirán a las consideraciones de coste/beneficio que acompañan estas medidas.

Administración y financiación

24. No debe disminuirse el nivel de ayuda a los diversos proyectos. Si bien admitimos la necesidad de una financiación rigurosa, consideramos que el nivel actual del programa es el mínimo necesario para su viabilidad, y que no sería correcto reducir simplemente la cantidad disponible para cada uno de los proyectos como forma de financiar un mayor número de proyectos.

25. Debe hallarse la forma de limitar los retrasos en la elaboración y la puesta en marcha de los proyectos.

26. Repetimos las recomendaciones anteriores sobre la necesidad de fortalecer los vínculos entre el programa de protección contra las radiaciones y otras unidades de investigación de la DG XII y las demás Direcciones Generales. Esto puede requerir un mecanismo algo más formal que el que existe en la actualidad.

27. Habría que examinar el sistema de revisión entre pares para garantizar, en la medida de lo posible, un procedimiento transparente, y para dar acceso al programa a unidades de investigación de menor tamaño, y a planteamientos científicos innovadores y menos ortodoxos. Reflejamos aquí una recomendación de un grupo anterior, que no se cumplió.

28. Debería seguir procurándose que las instancias encargadas de formular las normas tengan en cuenta los resultados de las actividades de investigación. Los vínculos con la DG XI deben ser más firmes y formalizados. Habría que considerar la posibilidad de establecer el requisito formal de consultar los procedimientos como parte del artículo 31, y de registrar el hecho de que se hayan llevado a cabo estas consultas.

29. Es urgente una interacción estrecha con el programa de investigación sobre dosimetría de la radiación e instrumentación del Departamento de Energía (DOE) de los Estados Unidos, sobre todo dado que en la actualidad el DOE parece estar revisando las prioridades de la gestión del programa de investigación sobre salud y medio ambiente.

30. También debería continuar y desarrollarse la interacción con otros programas de investigación fuera de la Unión Europea.

RESUME

Le mandat du groupe d'experts est décrit succinctement au chapitre 1. Les examens détaillés effectués par le groupe sont présentés dans les chapitres correspondants et des recommandations précises suivent la présente synthèse. Les conclusions générales peuvent cependant être résumées comme suit:

- Le programme 1990-1992 a continué à marquer des progrès satisfaisants, voire remarquables dans certains domaines. Il a été adapté à l'évolution des besoins et au développement des connaissances et s'est révélé correctement fondé et générateur de précieux résultats de recherche.

- Des changements sensibles se sont produits dans l'approche suivie pour le programme, notamment en ce qui concerne l'élaboration de contrats multinationaux et l'extension à des études en relation avec des travaux réalisés dans des pays d'Europe orientale, ainsi que la liaison avec des programmes de recherche menés en dehors de l'Union européenne.

- Le programme est géré efficacement. Le recours à des experts conseils n'est pas systématique, par exemple pour l'examen des propositions de recherche par des confrères, mais se limite principalement à la participation d'un petit nombre d'entre eux au CGC.

- Il faut constamment veiller à ce que les résultats de la recherche soient pleinement pris en considération lors de l'élaboration des politiques sociales et législatives de l'Union. Sur ce point, certaines questions d'organisation sont évoquées dans les recommandations.

- Il est également nécessaire de rendre plus rapide et plus "conviviale" l'organisation administrative et financière soutenant le programme.

Des commentaires sur des points particuliers sont développés dans les chapitres suivants, notamment:

Chapitre 3

L'équilibre général du programme a légèrement changé au cours du temps, et nous avons formulé des recommandations concernant un ou deux domaines auxquels il semble approprié d'accorder une plus haute priorité. Nous indiquons notamment comme domaines particulièrement intéressants les lésions dues aux irradiations aiguës et l'importance des expositions au radon dans la vie privée.

Il importe que les évènements tragiques de Tchernobyl ne dominent pas la discussion en matière de protection radiologique. Nous attirons l'attention sur le fait que des accidents moins spectaculaires, par exemple la perte ou le vol de sources, causent davantage de lésions et de morts que les réacteurs et leurs pannes eventuelles. Il importe également de reconnaître que la recherche en matière de radioprotection a des implications sociales beaucoup plus vastes (préoccupations d'ordre médical et écologique concernant le radon, etc.) que les problèmes plus limités de sécurité et de santé créés par les activités de l'industrie nucléaire.

L'utilisation très répandue de contrats multinationaux a nécessité un travail important de la part des services de la Commission et des coordonnateurs, et nous nous félicitons des mesures prises pour clarifier les tâches de ces derniers. L'appui et les orientations fournis par le CGC sont toujours essentiels, et nous avons commenté ce point ainsi que d'autres aspects du programme dans les recommandations 16 à 30.

Les recommandations 2 et 23 expriment notre préoccupation devant le fait que, malgré de nombreuses années de recherches et d'études fructueuses, et en dépit de nombreuses tentatives pour améliorer la façon dont le public perçoit et comprend le programme,la situation actuelle doit être considérée comme peu satisfaisante, et il se pourrait qu'il faille adopter une approche psycho-sociale et un mode de communication différents. Ce problème dépasse le domaine de la radioprotection et relève de la question générale des doutes et de la défiance couramment ressentis par le public vis-à-vis de la science et de la technologie de pointe.

Chapitre 4

La mise en place du programme post-Tchernobyl ainsi que celle du programme PECO ont eu une grande importance. Nous sommes tout-à-fait favorables à l'échange de scientifiques entre la CEI et l'Union, et les programmes semblent se développer de manière satisfaisante. A ce jour, cependant, nous ne disposons pas de résultats suffisants pour évaluer convenablement ces travaux.Nous recommandons qu'une nouvelle évaluation soit réalisée à ce sujet dans un an ou deux, lorsque suffisamment de résultats et de rappports auront été recueillis. A l'avenir, les travaux dans le cadre du programme post-Tchernobyl nécessiteront une forte intégration, non seulement au sein de chaque projet, mais aussi entre les équipes chargées des projets; des assurances nous ont été données que cette question est étudiée attentivement.

Chapitre 5

Comme l'ont fait les rapports précédents, nous avons accordé une attention particulière à la formation. L'interaction est importante entre les programmes nationaux de formation et les activités à l'échelon communautaire, et nous estimons nécessaire d'établir une coordination solide dans ce domaine au moyen d'un mécanisme bien défini. Peut-être faudrait-il assurer à la formation davantage de publicité, et assurément il convient de distinguer nettement son budget de celui de la recherche. Dans certains cas, le contenu éducatif de certains aspects des programmes multinationaux était mis en avant pour en justifier l'existence. Cette tendance est dangereuse, et nous estimons que, malgré l'importance des échanges de scientifiques et d'autres activités de ce genre, la participation d'un individu à un programme de recherche doit dépendre de son aptitude à contribuer à leurs résultats plutôt que d'un profit éventuel dans le futur. Il est évidemment important de permettre la formation et le développement grâce au partage d'installations avec d'autres pays, et il convient d'établir un programme clair à ce sujet. Nous donnons davantage de détails dans les recommandations 11 - 15.

Chapitre 6

Nous avons évoqué plus haut le rôle appréciable joué par le CGC dans le déroulement du programme et nous formulons des recommandations à ce sujet, notamment à propos d'un problème qui nous est apparu concernant la participation à l'ensemble du programme d'unités de

recherche plus petites et peut-être moins orthodoxes, ainsi que du risque que, d'une manière mystérieuse, le CGC soit perçu comme devenant une sorte de club duquel les unités plus petites ou moins reconnues pourraient se sentir exclues. Nous ne pensons pas qu'il en est ainsi mais, certaines personnes ayant cette impression, il convient, si possible, de résoudre le problème en élargissant la composition du CGC et/ou en établissant un système de rotation ou en limitant la durée de la nomination à cet organisme. Nous avons déjà mentionné des critiques concernant certaines procédures comptables, et cette question, bien qu'elle puisse paraître relativement mineure, a de graves conséquences. Des retards de paiement importants peuvent créer de sérieux problèmes de moral parmi le personnel et dissuader les collaborateurs, même débutants, qui possèdent des compétences particulières, de rester à leurs postes, notamment dans les petites unités. Cette question est traitée dans le chapitre et dans la recommandation 25.

RECOMMANDATIONS

Généralités

1. Le programme examiné est efficace, et nous recommandons qu'il soit poursuivi, avec au moins le niveau d'aide actuel. La gestion présente du programme a des résultats positifs mais nous recommandons d'alléger la charge imposée aux services de la Commission.

2. Au cours des deux dernières décennies, le public a perdu une grande part de sa confiance dans la science et dans les scientifiques. Il est difficile de déterminer comment le problème peut être résolu par le programme autrement qu'en continuant à réaliser des travaux scientifiques de qualité. Cependant, nous estimons ce point si important qu'il convient d'attirer l'attention d'autres directions générales sur la nécessité d'un programme solide d'information du public, de recherche et d'éducation, pour essayer de combattre l'incompréhension et la peur actuelles concernant les risques de radiations. Il convient d'accorder une attention particulière à l'éducation de certains groupes, par exemple à celle des médecins généralistes qui peuvent avoir l'influence la plus décisive sur l'opinion et la compréhension du public, et dont les connaissances de base sont parfois limitées.

3. Un système de rotation devrait être établi pour les membres du CGC et il faudrait notamment examiner comment les petits organismes de recherche peuvent être mieux représentés.

Recherche

4. Les recherches en dosimétrie biologique doivent continuer à être considérées comme un domaine prioritaire.

5. Il convient de maintenir une base forte de recherche fondamentale afin d'assurer le support nécessaire aux besoins variés de la recherche appliquée.

6. Les études sur les effets des doses faibles et des expositions de faible débit ainsi que l'importance de ces études pour la politique publique et la compréhension de ces effets sont considérées comme essentielles.

7. La poursuite d'une interaction étroite avec les travaux menés par les Etats-Unis pour établir une base de données de radiobiologie est vivement encouragée.

8. Des initiatives doivent être prises pour garantir l'application des connaissances et de la technologie en biologie moléculaire aux recherches dans le domaine de la radioprotection.

9. Des efforts supplémentaires pour réaliser une mise en commun des données épidémiologiques sont fortement recommandés afin que les capacités statistiques de la recherche s'améliorent. Les études à petite échelle de portée insuffisante doivent être découragées.

10. Les risques pour la santé que représentent des expositions au radon sont un domaine dans lequel se pose un problème difficile à résoudre de conflit entre les preuves présentées et leurs interprétations. Nous recommandons d'accorder une haute priorité à cette partie du programme.

Formation

11. Il convient de définir des dispositions de financement séparées pour la formation. La nécessité d'assurer un apport régulier de scientifiques compétents dans le domaine de la radioprotection a été soulignée par des évaluations antérieures, et nous faisons écho à cette préoccupation. Notre rapport montre que beaucoup d'efforts ont été fournis, mais ils doivent se poursuivre et probablement redoubler. Un budget de formation doit être clairement établi (séparément du budget de recherche) et une structure de gestion de la formation, visible et active, doit être mise en place avec des services de la Communauté et des Etats membres. Les actions incluses dans le programme de recherche ne doivent pas être confondues avec ces mesures.

12. Les activités d'éducation et de formation de la Commission doivent être harmonisées avec des activités du même genre lancées par d'autres organisations internationales et organismes scientifiques (par exemple, l'IAEA, l'ILO, l'OMS, l'IRPA), concernant à la fois le contenu de l'enseignement et les groupes cibles.

13 La possibilité de délivrer un certificat de réussite, qui serait reconnu dans toute l'Europe, pour la participation à un cours de formation apparaît déjà comme un besoin pressant. Il convient de soumettre d'urgence la question à la nouvelle structure de gestion de la formation recommandée ci-dessus.

14. Il convient d'accorder plus d'importance aux cours de formation destinés aux scientifiques de haut niveau (formation des enseignants) et à la transmission par les organismes nationaux des connaissances ainsi obtenues aux utilisateurs particuliers ou aux praticiens de la radioprotection.

15. Il convient d'exploiter toutes les possibilités d'octroi de bourses afin d'encourager la participation à des cours de formation reconnus organisés par les autorités nationales. L'Union devrait tenir un registre de ces cours.

Gestion des programmes

16. Il convient de développer le recours à des accords d'association.

17. Nous appuyons les propositions présentées concernant la clarification du rôle des coordonnateurs et une plus grande interaction entre les coordonnateurs eux-mêmes dans certains éléments du programme.

18. Bien que chauds partisans des projets multinationaux, nous aimerions voir ménager à des universitaires de talent qui ne s'intégreraient pas aisément dans de tels projets la possibilité de solliciter et, le cas échéant, d'obtenir une aide.

19. Nous recommandons de continuer à soutenir l'EULEP, l'EURADOC et l'UIC ainsi que leur rôle dans la mise en place d'équipes travaillant en collaboration.

Collaboration

20. Les études relatives à la contamination et à la surexposition des personnes ne doivent pas porter uniquement ou essentiellement sur les conséquences de l'accident de Tchernobyl. Des incidents antérieurs de nature diverse devraient aussi être examinés, car des informations d'une valeur considérable sont probablement disponibles à leur sujet. Il convient d'accorder une attention particulière à l'évaluation et au traitement du syndrome d'irradiation aiguë et d'autres effets non stochastiques.

21. Il convient d'encourager les échanges de scientifiques entre la CEI et l'Union européenne.

22. La partie du programme concernant le suivi de Tchernobyl et les actions PECO devrait être évaluée séparément dans un an ou deux, lorsqu'il sera possible de présenter des résultats substantiels.

23. Il convient d'accorder une attention accrue aux études des conséquences psycho-sociales de mesures comme la mise à l'abri et l'évacuation consécutives à une contamination de l'environnement. Des études de ce genre aideront à apprécier les rapports avantages-coût pour ces mesures.

Administration et financement

24. Le niveau des aides fournies à chaque projet ne doit pas être réduit. Tout en reconnaissant la nécessité d'une austérité financière, nous estimons que la portée actuelle du programme représente le minimum nécessaire à sa viabilité et que se contenter de réduire les subventions accordées aux projets individuels afin de fournir

une aide à d'autres projets ne serait pas une solution appropriée pour la poursuite du programme.

25. Il convient d'étudier des moyens de limiter les délais dans la formulation et le lancement des projets.

26. Nous reprenons les recommandations déjà présentées concernant la nécessité de renforcer les liens entre le programme de radioprotection et d'autres unités de recherche au sein de la DG XII et d'autres directions générales. Il convient pour ce faire de prendre des dispositions plus officielles que celles qui existent actuellement.

27. Il faut étudier le système d'examen par des confrères de manière à en assurer la transparence dans la mesure du possible, et à ouvrir le programme à des unités de recherche plus petites et à des approches scientifiques innovatrices et moins orthodoxes. Cette recommandation fait écho à une recommandation antérieure présentée sans succès par un autre groupe d'experts.

28. Il convient de toujours veiller à communiquer les résultats des activités de recherche aux parties concernées par l'établissement de normes. Les liens avec la DG XI doivent être plus étroits et plus officiels. Il faut examiner s'il convient d'exiger officiellement la consultation figurant parmi les procédures prévues par l'article 31 et l'enregistrement de cette consultation.

29. Une interaction étroite avec le programme de recherche du ministère américain de l'énergie (DOE) dans le domaine de la dosimétrie des radiations et de l'instrumentation, maintenant surtout que les responsables du programme de recherche en matière de santé et d'environnement du DOE paraissent procéder à une réévaluation des priorités.

30. Une interaction avec d'autres programmes de recherche en dehors de l'Union européenne doit également être poursuivie et développée.

ΠΕΡΙΛΗΨΗ

Οι αρμοδιότητες της ομάδας αξιολόγησης περιγράφονται εν συντομία στο κεφάλαιο 1. Οι λεπτομέρειες της εξέτασης στην οποία προέβη η ομάδα εκτίθενται στα κεφάλαια που ακολουθούν και ειδικές συστάσεις παρέχονται μετά την παρούσα περίληψη. Ωστόσο, τα γενικά πορίσματα συνοψίζονται ως εξής:

- Η πρόοδος του προγράμματος 1990-1992 συνεχίστηκε με τρόπο ικανοποιητικό και σε ορισμένα ερευνητικά πεδία ήταν μάλιστα σημαντική. Το πρόγραμμα προσαρμόστηκε στις μεταβαλλόμενες ανάγκες και στην διεύρυνση των γνώσεων και αποδείχθηκε ότι είναι ορθά προσανατολισμένο και ότι παρέχει αξιόλογα ερευνητικά αποτελέσματα.

- Σημειώθηκαν αξιοσημείωτες αλλαγές στην προσέγγιση του προγράμματος, ιδίως όσον αφορά την ανάπτυξη πολυεθνικών συμβάσεων, την επέκτασή του σε μελέτες που αφορούν εργασίες των χωρών της Ανατολικής Ευρώπης και τη δημιουργία δεσμών με ερευνητικά προγράμματα χωρών εκτός της ΕΕ.

- Η διαχείριση του προγράμματος είναι αποτελεσματική. Δεν αξιοποιούνται όμως πλήρως οι σύμβουλοι - εμπειρογνώμονες, οι οποίοι θα μπορούσαν να χρησιμοποιηθούν, επί παραδείγματι, στο πλαίσιο της εξέτασης των ερευνητικών προτάσεων από τρίτους ειδικευμένους στους σχετικούς τομείς, ενώ λίγοι μόνο από αυτούς συμμετέχουν στην Επιτροπή Διαχείρισης και Συντονισμού (ΕΔΣ).

- Απαιτείται συνεχής επαγρύπνηση προκειμένου να εξασφαλιστεί ότι τα αποτελέσματα της έρευνας λαμβάνονται πλήρως υπόψη κατά την ανάπτυξη της κοινωνικής και νομοθετικής πολιτικής της ΕΕ. Οι συστάσεις που ακολουθούν περιλαμβάνουν ορισμένες οργανωτικές πτυχές σχετικά με το θέμα αυτό.

- Η διοικητική και οικονομική οργάνωση που πλαισιώνει το πρόγραμμα πρέπει να βελτιωθεί ώστε να λειτουργεί ταχύτερα και να καταστεί "φιλικότερη προς τους χρήστες".

Στα επόμενα κεφάλαια αναλύονται οι ειδικές παρατηρήσεις:

Κεφάλαιο 3

Η γενική ισορροπία του προγράμματος μεταβλήθηκε ελαφρώς με την πάροδο του χρόνου και διατυπώσαμε συστάσεις για ένα ή δύο ερευνητικά πεδία στα οποία πιστεύεται ότι πρέπει να δοθεί μεγαλύτερη προτεραιότητα. Συγκεκριμένα, επισημαίνουμε ως πεδία ιδιαίτερου ενδιαφέροντος τις οξείες βλάβες που προκαλούνται από ακτινοβολίες και τη σημασία της εξωεπαγγελματικής έκθεσης σε ραδόνιο.

Το τραγικό και δραματικό ατύχημα του Τσερνομπίλ δεν πρέπει να κυριαρχεί στις συζητήσεις της ακτινοπροστασίας. Εφιστούμε την προσοχή στο γεγονός ότι έχουν προκληθεί περισσότεροι τραυματισμοί και θάνατοι από λιγότερο θεαματικά ατυχήματα όπως περιστατικά απώλειας ή κλοπής ραδιενεργών υλικών κλπ, παρά από τους αντιδραστήρες και την κακή λειτουργία τους. Αξίζει επίσης να αναγνωρισθεί το γεγονός ότι η έρευνα στον τομέα της ακτινοπροστασίας έχει ευρύτερες συνέπειες για την κοινωνία (ιατρικής φύσεως, περιβαλλοντικής φύσεως προβληματισμοί για το ραδόνιο, κλπ.) απ΄ό,τι οι στενές αντιλήψεις για την ασφάλεια και την υγεία που σχετίζονται με τη λειτουργία των πυρηνικών εγκαταστάσεων .

Ιδιαίτερα εκτεταμένη χρήση πολυεθνικών συμβάσεων απαίτησε σκληρή εργασία εκ μέρους του προσωπικο της Επιτροπής και των συντονιστών και εκφράζουμε την ικανοποίησή μας για τις προσπάθειες πο καταβάλλονται με σκοπό την αποσαφήνιση των καθηκόντων των συντονιστών. Η υποστήριξη κα καθοδήγηση που παρέχει η Επιτροπή Διαχείρισης και Συντονισμού (ΕΔΣ) εξακολουθεί να είναι ζωτική σημασίας. Το θέμα αυτό καθώς και άλλες πτυχές του προγράμματος σχολιάζονται στις συστάσεις 1 έως 30.

Οι συστάσεις 2 και 23 αντικατοπτρίζουν τις ανησυχίες μας όσον αφορά το γεγονός ότι, παρά τη πολυετή επιτυχή έρευνα και μελέτη και παρά τις πολλαπλές προσπάθειες για τη βελτίωση τη αντίληψης και κατανόησης του κοινού, η παρούσα κατάσταση δεν θεωρείται ικανοποιητική και ίσω πρέπει να ανατρέξουμε σε διαφορετικές ψυχο-κοινωνικές προσεγγίσεις και μεθόδους επικοινωνίας. Τ πρόβλημα αυτό υπερβαίνει τα πλαίσια της ακτινοπροστασίας και εντάσσεται στο γενικό τομέα τω ανησυχιών του κοινού και της έλλειψης εμπιστοσύνης έναντι της προηγμένης επιστήμης και τεχνολογία γενικά.

Κεφάλαιο 4

Τόσο το πρόγραμμα που αναπτύχθηκε μετά το ατύχημα του Τσερνομπίλ όσο και το πρόγραμμα για τι χώρες της Κεντρικής και Ανατολικής Ευρώπης (PECO) παρουσιάζουν ιδιαίτερη σημασία. Υποστηρίζουμ πλήρως την ανταλλαγή επιστημόνων μεταξύ της Κοινοπολιτείας Ανεξαρτήτων Κρατών και της ΕΕ κα τα προγράμματα εξελίσσονται ικανοποιητικά. Ωστόσο, τα αποτελέσματα που διατίθενται επί τα παρόντος δεν επαρκούν για να επιτρέψουν την ουσιαστική αξιολόγηση των εργασιών. Το πεδίο αυτ πρέπει να αξιολογηθεί περαιτέρω σε ένα ή δύο έτη όταν θα υπάρχουν αρκετά αποτελέσματα κα εκθέσεις. Οι μελλοντικές εργασίες για το πρόγραμμα που αναπτύχθηκε μετά το Τσερνομπίλ θ απαιτήσουν σταθερή ολοκλήρωση όχι μόνο στο πλαίσιο των επιμέρους έργων, αλλά και μεταξύ τω ομάδων από τις ενδείξεις που διαθέτουμε προκύπτει ότι το θέμα αυτό εξετάζεται σοβαρά.

Κεφάλαιο 5

Όπως και στις προηγούμενες εκθέσεις, αποδώσαμε ιδιαίτερη προσοχή στην επιμόρφωση. Η αλληλεπίδραση μεταξύ εθνικών επιμορφωτικών προγραμμάτων και δραστηριοτήτων κοινοτικής κλίμακα είναι σημαντική και πιστεύουμε ότι στον τομέα αυτό απαιτείται ενισχυμένος συντονισμός μέσω ενό σαφώς καθορισμένου μηχανισμού. Το θέμα πρέπει να τύχει ίσως μεγαλύτερης δημοσιότητας και, είνα αναμφισβήτητο ότι ο προϋπολογισμός για την επιμόρφωση πρέπει να διαχωρίζεται σαφώς από τι δαπάνες της έρευνας. Παρατηρήθηκε ορισμένες φορές η τάση, διάφορες πτυχές των πολυεθνικώ προγραμμάτων να δικαιολογούνται βάσει του επιμορφωτικού τους περιεχομένου. Αυτό είναι επικίνδυν και πιστεύουμε ότι, παρ όλη τη σημασία των ανταλλαγών επιστημόνων και άλλων παρεμφερώ δραστηριοτήτων, η συμμετοχή στο ερευνητικό πρόγραμμα θα πρέπει να εξαρτάται από την ικανότητ συμβολής στην επίτευξη των αποτελεσμάτων του προγράμματος και όχι από υποθετικά μελλοντικ οφέλη. Ιδιαίτερη σημασία έχει αναμφισβήτητα και η από κοινού χρησιμοποίηση, στο πλαίσιο ενό σαφώς καθορισμένου προγράμματος, των εγκαταστάσεων και μέσων των διαφόρων κρατών για τον σκοπούς της επιμόρφωσης και της ανάπτυξης. Αναλυτικότερες συστάσεις παρατίθενται στα σημεία 11 15.

Κεφάλαιο 6

Συζητήσαμε προηγουμένως τον πολύτιμο ρόλο που διαδραματίζει η ΕΔΣ στην όλη διαδικασία κα διατυπώνουμε ορισμένες συστάσεις σχετικά με το θέμα αυτό και ιδίως με ένα πρόβλημα που προκύπτ από τη συμμετοχή στο πρόγραμμα μικρότερων και ίσως λιγότερο συμβατικών ερευνητικών μονάδω Κυκλοφορεί η άποψη ότι, κατά κάποιο περίεργο τρόπο, η ΕΔΣ μπορεί να εξελιχθεί σ ένα είδος λέσχη από την οποία οι μικρότερες ή λιγότερο αναγνωρισμένες μονάδες είναι δυνατόν να αισθάνονται αποκλεισμένες. Αν και δεν συμμεριζόμαστε την άποψη αυτή, πιστεύουμε ότι, εφόσον το εν λόγω θέμ απασχολεί ορισμένα άτομα, θα πρέπει να αντιμετωπιστεί, αν είναι δυνατόν, είτε με την αύξηση τω αριθμού των μελών της ΕΔΣ ή/και με την εναλλαγή των μελών της ή με τον διορισμό μελών για έν καθορισμένο χρονικό διάστημα. Έχουμε αναφερθεί ήδη στις επικρίσεις που διατυπώθηκαν όσον αφορ

τις λογιστικές διαδικασίες και, παρ΄όλο που το θέμα θα μπορούσε να θεωρηθεί σχετικά ασήμαντο, έχει σοβαρές συνέπειες. Προβλήματα που συνδέονται με την αποθάρρυνση του προσωπικού, με την συγκράτηση ειδικευμένου προσωπικού, συμπεριλαμβανομένου του νεαρής ηλικίας προσωπικού, αποκτούν μεγάλη σημασία όταν σημειώνονται σοβαρές καθυστερήσεις στις πληρωμές ιδίως των μικρότερων ερευνητικών ομάδων. Τα προβλήματα αυτά αναφέρονται στο κεφάλαιο και αντικατοπτρίζονται στη σύσταση 25.

ΣΥΣΤΑΣΕΙΣ

Γενικά

1. Το παρόν πρόγραμμα είναι αποτελεσματικό και συνιστούμε τη συνέχισή του με το ίδιο τουλάχιστον επίπεδο στήριξης. Η διαχείριση του προγράμματος, υπό τη σημερινή της μορφή είναι επιτυχής αλλά συνιστούμε τη μείωση του φόρτου εργασίας του προσωπικού της Επιτροπής.

2. Η εμπιστοσύνη του κοινού έναντι της επιστήμης και των επιστημόνων μειώθηκε σημαντικά την τελευταία εικοσαετία. Το πρόγραμμα μπορεί να συμβάλει στη βελτίωση της κατάστασης μόνο συνεχίζοντας την παραγωγή σοβαρής επιστημονικής εργα - Ωστόσο, πιστεύουμε ότι πρέπει να επιστήσουμε την προσοχή των άλλων Γενικών Διευθύνσεων στην ανάγκη διαμορφώσεως ενός ισχυρού προγράμματος ενημέρωσης του κοινού, έρευνας και εκπαίδευσης για να αντιμετωπιστεί η άγνοια και ο φόβος για τον κίνδυνο των ακτινοβολιών που επικρατεί επί του παρόντος. Ιδιαίτερη προσοχή πρέπει να δοθεί στην εκπαίδευση συγκεκριμένων ομάδων, όπως των ασκούντων γενική ιατρική οι οποίοι μπορούν να έχουν σημαντικότατη επίδραση στις αντιλήψεις και στην κατανόηση του κοινού και των οποίων οι βασικές γνώσεις επί του θέματος ενδέχεται να είναι ανεπαρκείς.

3. Για τα μέλη της ΕΔΣ είναι σκόπιμο να καθιερωθεί σύστημα εναλλαγής λαμβάνοντας ιδιαίτερα υπόψη την καλύτερη εκπροσώπηση στην επιτροπή των μικροτέρων ερευνητικών οργανισμών.

Έρευνα

4. Η έρευνα στον τομέα της βιολογικής δοσιμετρίας πρέπει να εξακολουθήσει να αντιμετωπίζεται ως ερευνητικό πεδίο προτεραιότητας.

5. Πρέπει να διατηρηθεί ένας ισχυρός πυρήνας βασικής έρευνας για την πλαισίωση των πολλαπλών αναγκών της εφαρμοσμένης έρευνας.

6. Ιδιαίτερο βάρος δίδεται στις μελέτες της επίδρασης των χαμηλών δόσεων και των χαμηλών ρυθμών και δόσεων και στη σημασία των μελετών αυτών για την κατανόηση του θέματος από το ευρύ κοινό και για την πολιτική που πρέπει να ακολουθηθεί σχετικά.

7. Ενθαρρύνεται σοβαρά η συνεχής στενή επαφή με τις προσπάθειες που καταβάλλονται στις Ηνωμένες Πολιτείες για την ανάπτυξη βάσης δεδομένων ραδιοβιολογίας.

8. Πρέπει να αναληφθούν πρωτοβουλίες που να διασφαλίζουν την εφαρμογή των γνώσεων και της τεχνολογίας της μοριακής βιολογίας στην έρευνα για την ακτινοπροστασία.

9. Ενθαρρύνονται κατ΄εξοχήν οι περαιτέρω προσπάθειες για την από κοινού χρήση των επιδημιολογικών δεδομένων με σκοπό τη βελτίωση της στατιστικής εμβέλειας της έρευνας. Ανεπαρκείς μελέτες μικρής κλίμακας πρέπει να αποθαρρύνονται.

10. Ένας τομέας όπου παρατηρείται σύγκρουση απόψεων όσον αφορά τα αποδεικτικά στοιχεία και την ερμηνεία τους, είναι οι ενδεχόμενες συνέπειες για την υγεία της έκθεσης σε ραδόνιο. Συνιστούμε να δοθεί ιδιαίτερη προτεραιότητα στο τμήμα αυτό του προγράμματος.

Επιμόρφωση

11. Πρέπει να διαμορφωθούν χωριστοί διακανονισμοί για την χρηματοδότηση της επιμόρφωσης. Επιβεβαιώνουμε αυτό που είχε τονιστεί ήδη σε προηγούμενες αξιολογήσεις, δηλαδή την ανάγκη τακτικής απασχόλησης ικανών επιστημόνων στον τομέα της ακτινοπροστασίας. Από την έκθεσή μας προκύπτει ότι, αν και έχουν καταβληθεί μεγάλες προσπάθειες προς την κατεύθυνση αυτή, αυτές θα πρέπει να συνεχιστούν και πιθανώς να αυξηθούν. Απαιτείται ένας σαφής καθορισμένος προϋπολογισμός για την επιμόρφωση (που να μην εντάσσεται στον προϋπολογισμό της έρευνας) και μια σαφής και δραστήρια δομή για τη διαχείριση της επιμόρφωσης στην οποία θα συμμετέχουν τόσο το προσωπικό όσο και κράτη μέλη. Οι δραστηριότητες στο πλαίσιο του ερευνητικού προγράμματος δεν πρέπει να συγχέονται με τις εν λόγω ενέργειες.

12. Οι εκπαιδευτικές και επιμορφωτικές δραστηριότητες της ΕΕΚ πρέπει να εναρμονίζονται με ανάλογες δραστηριότητες άλλων διεθνών οργανισμών και επιστημονικών φορέων (π.χ. ΔΟΑΕ, ΔΟΕ-ILO, ΠΟΥ (RPA - Διεθνής Ένωση Ακτινοπροστασίας), όσον αφορά τόσο το διδακτικό υλικό όσο και τις στοχοθετημένες ομάδες.

13. Η δυνατότητα εκδόσεως αναγνωρισμένου σε ευρωπαϊκή κλίμακα πιστοποιητικού που να αποδεικνύει την επιτυχή συμμετοχή σε μία οργανωμένη σειρά επιμορφωτικών μαθημάτων θεωρείται επιτακτική ανάγκη και θα πρέπει να ενταχθεί κατά προτεραιότητα στην διαχειριστική δομή για τη διαχείριση της επιμόρφωσης που συνιστάται ανωτέρω.

14. Μεγαλύτερη έμφαση πρέπει να δοθεί στα επιμορφωτικά μαθήματα που απευθύνονται στους έμπειρους επιστήμονες (εκπαίδευση των διδασκόντων) αφήνοντας στους εθνικούς οργανισμούς τη μέριμνα της μετάδοσης των ούτω αποκτηθεισών γνώσεων στους μεμονωμένους χρήστες ή στους ασκούντες το επάγγελμα της ακτινοπροστασίας.

15. Οι υπάρχουσες δυνατότητες χορηγήσεως υποτροφιών πρέπει να αξιοποιούνται πλήρως για την ενθάρρυνση της συμμετοχής σε αναγνωρισμένα επιμορφωτικά μαθήματα που οργανώνονται από τις εθνικές αρχές. Ένα αρχείο των μαθημάτων αυτών είναι σκόπιμο να τηρείται από την ΕΕ.

Διαχείριση του προγράμματος

16. Η χρήση συμφωνιών συνδέσεως πρέπει να επεκταθεί.

17. Υποστηρίζουμε τις προτάσεις που αφορούν την αποσαφήνιση του ρόλου των συντονιστών και την στενότερη συνεργασία μεταξύ των συντονιστών για ορισμένες πτυχές του προγράμματος.

18. Ενώ υποστηρίζουμε ένθερμα τα πολυεθνικά έργα, επιθυμούμε να δοθεί η δυνατότητα σε μεμονωμένους ταλαντούχους πανεπιστημιακούς που δεν μπορούν να ενταχθούν εύκολα στα εν λόγω σχήματα να ζητήσουν και, εφόσον είναι δυνατόν, να τύχουν συνδρομής.

19. Συνιστούμε να συνεχιστεί η στήριξη των EULEP, EURADOS, και IUR και ο ρόλος τους ως πηγή αντλήσεως ομάδων συνεργασίας.

<u>Συνεργασία</u>

20. Οι μελέτες που αφορούν τη ραδιενεργό μόλυνση ή την έκθεση του ανθρώπου σε υψηλές δόσεις ακτινοβολίας δεν πρέπει να περιορίζονται στις συνέπειες του ατυχήματος του Τσερνομπίλ ή να ασχολούνται κατά κύριο λόγο με αυτό. Διάφορα προγενέστερα ατυχήματα μπορούν επίσης να μελετηθούν δεδομένου ότι θα πρέπει να διατίθεται σχετικό υλικό μεγάλης αξίας. Ιδιαίτερη προσοχή πρέπει να δοθεί στην αξιολόγηση και την αγωγή του οξέος συνδρόμου ακτινοβόλησης και άλλων μη στοχαστικών επιδράσεων.

21. Είναι σκόπιμο να ενθαρρύνεται η ανταλλαγή επιστημόνων μεταξύ ΚΑΚ και ΕΕ.

22. Το τμήμα του προγράμματος που αναπτύχθηκε μετά το Τσερνομπίλ καθώς και το πρόγραμμα για τις χώρες της κεντρικής και ανατολικής Ευρώπης (PECO) πρέπει να αξιολογηθούν χωριστά μετά από ένα ή δύο έτη όταν θα διατίθενται αξιοσημείωτα αποτελέσματα.

23. Ιδιαίτερη προσοχή πρέπει να δοθεί στις μελέτες που αφορούν τις ψυχοκοινωνικές επιπτώσεις μέτρων όπως η εκκένωση των ατόμων και η προστασία τους σε καταφύγια σε περίπτωση μολύνσεως του περιβάλλοντος. Μελέτες αυτού του είδους συμβάλλουν στην εκτίμηση της σχέσης κόστος-αποτελεσματικότητα για τα μέτρα αυτά.

<u>Διοικητική οργάνωση και χρηματοδότηση</u>

24. Το επίπεδο της χρηματοδότησης των επιμέρους έργων δεν πρέπει να μειωθεί. Αν και αναγνωρίζουμε την οικονομική στενότητα που επικρατεί πιστεύουμε ότι το παρόν ύψος της χρηματοδότησης είναι το ελάχιστο για την εξασφάλιση της βιωσιμότητας του προγράμματος και ότι η μείωση του ποσού που διατίθεται για το κάθε επιμέρους έργο προκειμένου να χρηματοδοτηθεί μεγαλύτερος αριθμός έργων, δεν αποτελεί ορθή αντιμετώπιση.

25. Πρέπει να αναζητηθούν τρόποι περιορισμού των καθυστερήσεων στη διαμόρφωση και τη δρομολόγηση των έργων.

26. Επαναλαμβάνουμε προηγούμενες συστάσεις σχετικά με την ανάγκη ενισχύσεως των δεσμών μεταξύ του προγράμματος ακτινοπροστασίας και άλλων ερευνητικών μονάδων της ΓΔ XII και άλλων Γενικών Διευθύνσεων. Ίσως απαιτηθεί γι΄αυτό ένα περισσότερο επίσημο σύστημα από εκείνο που ισχύει επί του παρόντος.

27. Το σύστημα της επανεξέτασης των προτάσεων από τρίτους της ιδίας ειδικότητας πρέπει να αναθεωρηθεί ώστε να εξασφαλίζει τη μεγαλύτερη δυνατή διαφάνεια και να επιτρέπει την πρόσβαση μικρότερων ερευνητικών μονάδων στο πρόγραμμα καθώς και καινοτόμους και λιγότερο παραδοσιακές επιστημονικές προσεγγίσεις . Η σύσταση αυτή αντικατοπτρίζει την σύσταση μιας προηγούμενης ομάδας αξιολόγησης που δεν είχε ληθφεί υπόψη.

28. Πρέπει να συνεχιστούν οι προσπάθειες για την γνωστοποίηση των αποτελεσμάτων των ερευνητικών δραστηριοτήτων στα άτομα που ασχολούνται με τον καθορισμό προτύπων. Οι δεσμοί με την ΓΔΧΙ πρέπει να ενισχυθούν και να επισημοποιηθούν. Είναι επίσης σκόπιμο να εξεταστεί το ενδεχόμενο καθιέρωσης επισήμων διαβουλεύσεων στο πλαίσιο των διαδικασιών του άρθρου 31 και της τήρησης αρχείου όσον αφορά τις εν λόγω διαβουλεύσεις.

29. Παροτρύνεται στενή συνεργασία με το ερευνητικό πρόγραμμα του Υπουργείου Ενεργείας των ΗΠΑ για τη δοσιμετρία και τα όργανα μέτρησης και ακτινοβολίας ιδίως στην περίοδο αυτή όπου η Διοίκηση του ερευνητικού προγράμματος για την υγεία και το περιβάλλον του Υπουργείου επαναξιολογεί τις προτεραιότητες.

30. Η αλληλεπίδραση με άλλα ερευνητικά προγράμματα εκτός της Ευρωπαϊκής Ένωσης πρέπει να συνεχιστεί και να αναπτυχθεί.

RIASSUNTO

Il mandato del gruppo (Panel) è descritto brevemente al capitolo 1. Le osservazioni particolareggiate sono riportate nei capitoli successivi e le raccomandazioni specifiche figurano alla fine del presente riassunto. Le conclusioni generali possono comunque essere riassunte come segue:

- Il programma 1990-1992 è proseguito in modo soddisfacente segnando anche progressi notevoli in alcuni campi. Esso è stato adattato alle nuove esigenze e conoscenze, rivelandosi ben strutturato e atto a produrre risultati validi.

- A livello di impostazione vi sono stati notevoli cambiamenti, in particolare l'elaborazione di contratti multinazionali, nuovi studi connessi con attività nei paesi dell'Europa orientale e legami con programmi di ricerca di paesi non facenti parte dell'UE.

- La gestione è efficiente. Il ricorso a consulenti esperfi, ad es. nella valutazione delle proposte di ricerca non è una prassi diffusa e resta limitato essenzialmente alla partecipazione di alcuni di essi al CGC.

- Occorre una continua vigilanza per garantire che nell'elaborazione delle politiche sociali e legislative dell'UE si tenga pienamente conto dei risultati di ricerca. Al riguardo le raccomandazioni trattano alcuni aspetti organizzativi.

- Occorre anche snellire e rendere più agevole per gli utenti l'organizzazione amministrativa e finanziaria di supporto al programma.

Nei capitoli successivi sono approfonditi alcuni punti specifici, tra cui:

Capitolo 3

L'equilibrio generale del programma ha subito col tempo alcuni cambiamenti e le raccomandazioni concernono uno o due campi cui sembra opportuno conferire una maggiore priorità, in particolare le lesioni acute da radiazioni e l'importanza dell'esposizione non professionale al radon.

I tragici e gravi eventi di Chernobyl non devono dominare il dibattito sulla radioprotezione. Incidenti meno spettacolari, quali la perdita o il furto di sorgenti ecc. hanno infatti provocato più lesioni e decessi dei reattori e del loro cattivo funzionamento. E' anche importante riconoscere che la ricerca sulla radioprotezione presenta per la società (preoccupazioni mediche, ambientali sul radon ecc.) implicazioni più vaste che la mera considerazione della sicurezza e della salute in riferimento all'industria nucleare.

Il maggiore ricorso a contratti multinazionali ha richiesto molto lavoro al personale della Commissione e ai coordinatori e il gruppo nota con favore le iniziative in corso per precisare il compito dei coordinatori. Il supporto e la consulenza del CGC permangono vitali e al riguardo si rinvia alle raccomandazioni da 16 a 30.

Le raccomandazioni da 2 a 23 riflettono la preoccupazione del gruppo per il fatto che, pur dopo molti anni di ricerche e studi riusciti e malgrado i diversi tentativi di migliorare la percezione e la comprensione dei cittadini, la situazione attuale resta insoddisfacente e si dovranno probabilmente seguire approcci psico-sociali e di comunicazione diversi. Si tratta di un problema che va al di là della radioprotezione e che rientra nella sfera generale di scetticismo e mancanza di fiducia da parte dei cittadini nei confronti della scienza e della tecnologia avanzate.

Capitolo 4

Il programma "Dopo Chernobyl" e il programma PECO sono stati entrambi rilevanti. Il gruppo approva pienamente lo scambio di ricercatori tra la CSI e l'UE e l'evoluzione dei programmi sembra soddisfacente. I risultati attualmente disponibili non consentono tuttavia una valutazione effettiva dei lavori. Il gruppo raccomanda di prevedere un esame approfondito tra uno o due anni quando saranno disponibili risultati e relazioni in quantità sufficiente. Il programma "Dopo-Chernobyl" necessita un'integrazione salda, non solo tra singoli progetti, ma anche tra gruppi e, a quanto sembra, si sta attentamente studiando questo aspetto.

Capitolo 5

Come nelle relazioni precedenti, il gruppo ha dato particolare importanza all'aspetto formazione. L'interazione tra i programmi nazionali di formazione e le attività su scala comunitaria è importante e si configura necessario uno stretto coordinamento sulla base di una struttura ben definita. La formazione dovrebbe essere valorizzata agli occhi del pubblico e il bilancio ad essa assegnato dovrebbe essere nettamente distinto da quello per la spesa di ricerca. Talvolta sono stati giustificati determinati aspetti dei programmi multinazionali in nome della loro componente ricerca. Ciò può diventare pericoloso e, pur riconoscendo l'importanza dello scambio di ricercatori e di altre attività affini, la partecipazione al programma di ricerca dovrebbe essere in funzione della capacità di contribuire a produrre risultati piuttosto che di ipotetici utili futuri. La formazione e lo sviluppo mediante la messa in comune di impianti tra vari paesi sono ovviamente importanti e dovrebbe essere elaborato un programma preciso. Le raccomandazioni 11-15 contengono osservazioni specifiche al riguardo.

Capitolo 6

E' già stato illustrato l'importante ruolo svolto dal CGC e il gruppo formula in merito alcune raccomandazioni, con particolare riferimento ad un problema avvertito a livello di partecipazione all'intero programma da parte di unità di ricerca più piccole e forse meno ortodosse e all'eventuale pericolo che in un certo senso il CGC divenga una sorta di club dal quale i gruppi più piccoli o meno consolidati si sentano esclusi. Il gruppo ritiene che ciò non sia il caso ma, dato che il problema è stato sollevato, esso dovrebbe essere affrontato, aumentando il numero dei membri del CGC e/o mediante rotazione o nomine per una durata fissa presso tale organismo. Sono già state citate le critiche formulate alle procedure di contabilità e, anche se apparentemente il problema è secondario, le conseguenze possono essere serie. Problemi quali la motivazione del personale, la difficoltà di mantenere personale particolarmente qualificato, comprese persone giovani, divengono importanti se i pagamenti arrivano con forti ritardi, soprattutto nel caso dei gruppi più piccoli. Cfr. in proposito il pertinente capitolo e la raccomandazione 25.

RACCOMANDAZIONI

In generale

1. Il presente programma è efficace e il gruppo ne raccomanda la continuazione, per lo meno all'attuale livello di sostegno. La gestione è soddisfacente ma si dovrebbe ridurre l'onere lavorativo per il personale della Commissione.

2. Negli ultimi due decenni vi è stato un netto calo di fiducia da parte del pubblico nei confronti della scienza e dei ricercatori. Su questo punto il programma può intervenire in modo relativo, a parte il continuare a produrre lavori scientifici di qualità. Trattandosi di un aspetto molto importante, il gruppo ritiene tuttavia auspicabile richiamare l'attenzione di altre direzioni sulla necessità di un vasto programma di informazione, di ricerca ed educazione del pubblico per cercare di ovviare all'incomprensione e ai timori odierni circa i rischi di radiazione. Di

particolare rilevanza è la sensibilizzazione di categorie, quali i medici generici, particolarmente adatti ad influenzare la percezione e la comprensione dei cittadini e che possono avere essi stessi una scarsa conoscenza della problematica in causa.

3. Si dovrebbe prevedere un sistema di rotazione per i membri facenti parte del CGC ed esaminare in particolare la possibilità di una maggiore rappresentanza delle piccole organizzazioni di ricerca.

Ricerca

4. Continua priorità alla ricerca sulla dosimetria biologica.

5. Mantenimento di un forte nucleo di ricerca fondamentale, a supporto delle numerose esigenze della ricerca applicata.

6. Importanza particolare degli studi sugli effetti delle basse dosi e bassi ratei di dose e rilevanza di questi studi per la comprensione dei cittadini e la politica da adottare al riguardo.

7. Pieno supporto al mantenimento di una stretta interazione con le attività degli Stati Uniti ai fini di sviluppare una base di dati radiobiologica.

8. Lancio di iniziative per garantire l'applicazione nella ricerca sulla radioprotezione delle conoscenze e delle technologie di biologia molecolare.

9. Intensificazione dei lavori per la raccolta di dati epidemiologici, onde migliorare le disponibilità statistiche della ricerca, evitando studi su piccola scala di potenzialmente poco informativi.

10. Conferimento di una netta priorità alla problematica delle possibili conseguenze sanitarie dell'esposizione al radon, un campo dove le prove e l'interpretazione sono controverse.

Formazione

11. I finanziamenti per la formazione dovrebbero essere identificati a parte. Come già evidenziato in valutazioni precedenti, la radioprotezione deve poter contare su un afflusso regolare di ricercatori: un concetto che il nostro gruppo intende ribadire. Il presente rapporto mostra che molto è stato fatto in questa direzione, ma questo deve rappresentare uno sforzo continuo e probabilmente da accrescere. Dovrebbero esistere: un bilancio di formazione chiaramente definito (separato dal bilancio di ricerca) e una struttura gestionale, trasparente e operativa, che comprenda personale dell'Unione e degli Stati Membri. Le operazioni facenti capo a tale struttura non dovrebbero essere confuse con le attività facenti parte del programma di ricera.

12. Opportunità di armonizzare le attività di educazione e formazione della Commissione CE con quelle svolte da altre organizzazioni ed organismi scientifici internazionali (AIEA, OIL, OMS, IRPA), a livello di materiale didattico e di categorie target.

13. Necessità sempre più evidente di prevedere il rilascio di un certificato riconosciuto a livello europeo che attesti la partecipazione ad un corso di formazione. La nuova struttura gestionale per la formazione, già menzionata, dovrebbe trattare questo aspetto tempestivamente.

14. Maggiore importanza da conferire ai corsi di formazione destinati ai ricercatori affermati (formazione degli insegnanti) e trasmissione, a cura delle organizzazioni

nazionali, delle conoscenze così ottenute ai singoli utenti o agli operatori nel campo della radioprotezione.

15. Pieno ricorso ai sistemi di borse per incoraggiare la partecipazione a corsi di formazione riconosciuti, organizzati dalle autorità nazionali. L'UE dovrebbe elaborare e aggiornare un elenco di questi corsi.

Gestione del programma

16. Maggiore ricorso agli accordi di associazione.

17. Esame delle possibilità di chiarire il ruolo dei coordinatori e di prevedere una maggiore interazione tra gli stessi in taluni aspetti del programma.

18. Pur approvando pienamente la rilevanza di progetti multinazionali, opportunità di prevedere un sostegno per singoli docenti universitari di talento che non trovino facile inserimento.

19. Continuazione del sostegno fornito a EULEP, EURADOS e IUR e al compito da essi svolto nel creare gruppi di collaborazione.

Collaborazione

20. Gli studi sulla contaminazione e la sovraesposizione delle persone non dovrebbero limitarsi all'incidente di Chernobyl o focalizzarsi su esso. Occorre studiare anche incidenti precedenti di varia natura poichè essi offrono materiale di enorme valore. Particolare attenzione dovrebbe essere riservata alla diagnosi e alla terapia della sindrome da irradiazione acuta e di altri effetti non stocastici.

21. Sostegno allo scambio di ricercatori tra la CSI e l'UE.

22. Valutazione separata della parte del programma concernente il "dopo Chernobyl" e le azioni PECO, da condurre fra uno o due anni quando saranno disponibili dei risultati significativi.

23. Maggiore attenzione andrebbe conferita agli studi sulle conseguenze psicosociali di misure di protezione e di evacuazione dopo una contaminazione ambientale. Studi del genere saranno di aiuto nel formulare de valutazioni di costo - beneficio connesse con tali misure.

Gestione e finanziamento

24. Non si deve ridurre l'entità del sostegno a favore di singoli progetti. Pur riconoscendo la necessità di un rigore finanziario, la portata attuale del programma rappresenta il minimo necessario perché esso resti operativo e l'opzione di ridurre gli importi assegnati a singoli progetti al fine di sostenere un maggior numero di progetti non si configura come valida.

25. Esame delle possibilità di evitare i ritardi nella formulazione e nell'avvio dei progetti.

26. Conferma della necessità di rafforzare i legami tra il programma di radioprotezione e altre unità di ricerca presso la DG XII e altre direzioni generali, eventualmente in chiave meno informale rispetto alla prassi odierna.

27. Il sistema basato sul "giudizio dei pari" dovrebbe essere quello di scelta al fine di assicurafe, per quanto è possibile, la trasparenza e di permettere l'accesso al programma delle unità di ricerca più piccole e degli approcci scientifici innovativie

meno ortodossi. Questa raccomandazione ricalca quella formulata da un gruppo precedente cui non è stato dato seguito.

28. I responsabili nel campo della fissazione di norme devono essere continuamente informati in merito ai risultati delle attività di ricerca. Consolidamento e ufficialità dei legami con la DG XI. Eventualmente requisito formale di consultazione, come parte delle procedure Articolo 31 e registrazione dell'avvenuta consultazione.

29. Necessità di una stretta interazione con il programma di ricerca del "Department of Energy's (DOE)" degli Stati Uniti per quanto riguarda la dosimetria della radiazione e la strumentazione, particolarmente durante l'attuale periodo di ridefinizione delle priorità effettuata nell'ambito del programma di ricerca Salute e Ambiente del DOE.

30. Prosecuzione ed ampliamento dell'interazione con altri programmi di ricerca fuori dell'Unione europea.

SAMENVATTING

De opdracht van het Panel is kort uiteengezet in Hoofdstuk 1. Het door het Panel verrichte onderzoek is in de daarop volgende hoofdstukken uitvoerig beschreven en specifieke aanbevelingen volgen op deze samenvatting. De algemene conclusies kunnen als volgt worden samengevat:

- Het programma 1990-1992 heeft verder een bevredigende en op sommige gebieden zelfs een uitstekende vooruitgang geboekt. Het is aangepast aan veranderende behoeften en toenemende kennis en er blijkt een goede motivatie te bestaan. Er zijn dan ook nuttige onderzoekresultaten behaald.

- Er zijn duidelijke veranderingen gekomen in de aanpak van het programma, met name bij de ontwikkeling van multinationale contracten en de uitbreiding tot studies in verband met werkzaamheden in Oosteuropese landen, alsmede bij het leggen van banden met onderzoekprogramma's buiten de landen van de EU.

- Het programma wordt doeltreffend beheerd. Van deskundige adviseurs wordt geen uitgebreid gebruik gemaakt, bij voorbeeld voor de beoordeling van onderzoekvoorstellen; een en ander blijft vooral beperkt tot de deelneming van enkele deskundigen in het CGC.

- Blijvende waakzaamheid is geboden om ervoor te zorgen dat bij de opstelling van het sociale en wetgevingsbeleid van de EU terdege rekening wordt gehouden met de onderzoekresultaten. Enkele organisatorische aspecten in dit verband worden aan de orde gesteld in de aanbevelingen.

- Ook moet de administratieve en financiële organisatie achter het programma vlotter en "gebruikersvriendelijker" worden gemaakt.

In de volgende hoofdstukken wordt onder meer nader ingegaan op de volgende punten:

Hoofdstuk 3

Het algehele evenwicht van het programma is in de loop van de tijd wat verschoven en in de aanbevelingen worden enkele gebieden genoemd waarvoor een hogere prioriteit wenselijk lijkt. In het bijzonder worden acute bestralingsletsels en de betekenis van niet-beroepsmatige blootstelling aan radon als bijzondere aandachtsgebieden aangewezen.

Het is van belang dat de discussie over stralingsbescherming niet wordt overheerst door de tragische gebeurtenissen van Tsjernobyl. Zo wordt de aandacht gevestigd op het feit dat meer letsels en overlijdens worden veroorzaakt door minder spectaculaire ongevallen zoals verloren of gestolen bronnen dan door reactoren en defecten daarvan. Ook is het van belang dat wordt ingezien dat onderzoek op het gebied van stralingsbescherming voor de samenleving veel ruimere implicaties heeft (medische aspecten, milieu-overwegingen met betrekking tot radon, enz.) dan alleen maar de vraag naar de veiligheid en gezondheid van de kernindustrie.

Het sterk toegenomen gebruik van multinationale contracten betekent een zware werklast

voor het personeel van de Commissie en de coördinatoren, en de voorgenomen maatregelen om de taak van de coördinatoren te verduidelijken worden verwelkomd. De ondersteuning en de begeleiding van het CGC blijven van vitaal belang en in de aanbevelingen 16 tot 30 wordt ingegaan op dit en andere aspecten van het programma.

De aanbevelingen 2 en 23 geven uitdrukking aan de bezorgdheid dat ondanks vele jaren van succesvol onderzoek en studie, en in weerwil van de vele pogingen om de acceptatie en het begrip van het publiek te vergroten, de huidige situatie als onbevredigend moet worden beschouwd. Het is niet uitgesloten dat verschillende psychosociale en communicatie-benaderingen moeten worden gebruikt. Dit probleem is uiteraard veel ruimer dan dat van de stralingsbescherming alleen en heeft te maken met twijfel en gebrek aan vertrouwen bij het publiek in geavanceerde wetenschap en technologie in het algemeen.

Hoofdstuk 4

De ontwikkeling van het post-Tsjernobyl-programma en het programma voor de landen van Midden- en Oosteuropa is belangrijk en betekenisvol geweest. De uitwisseling van wetenschappers tussen het GOS en de EU heeft onze volle steun en de programma's lijken bevredigend te verlopen. Momenteel zijn er echter onvoldoende resultaten bekend om een effectieve evaluatie van deze werkzaamheden te kunnen verrichten. Wij bevelen dan ook aan om over een of twee jaar, wanneer er voldoende resultaten en rapporten beschikbaar zijn, een verdere evaluatie uit te voeren. Voor verdere werkzaamheden in het kader van het post-Tsjernobyl-programma is een behoorlijke integratie nodig, niet alleen binnen de afzonderlijke projecten maar ook tussen de projectteams; wij menen begrepen te hebben dan voor dit aspect wel een grote inspanning wordt gedaan.

Hoofdstuk 5

Zoals ook al in vorige verslagen het geval was, hebben wij veel aandacht besteed aan opleiding. De wisselwerking tussen nationale opleidingsprogramma's en activiteiten in de gehele Gemeenschap is belangrijk en wij constateren dat er op dit gebied behoefte is aan sterke coördinatie volgens een duidelijk omstreven mechanisme. Misschien moet hieraan meer ruchtbaarheid worden gegeven en in ieder geval moeten de middelen voor opleiding duidelijk worden gescheiden van de onderzoekuitgaven. Af en toe was er een tendens om diverse aspecten van de multinationale programma's te verantwoorden op grond van het opleidingsgehalte ervan. Dat is gevaarlijk en wij zijn van mening dat, hoe belangrijk de uitwisseling van wetenschappers en andere soortgelijke activiteiten ook zijn, deelneming aan het onderzoekprogramma gebaseerd moet zijn op de mogelijkheid een bijdrage aan de resultaten van dat programma te leveren en niet op eventuele voordelen voor de toekomst. Opleiding en ontwikkeling door het delen van installaties met die van andere landen is natuurlijk belangrijk en daar moet een duidelijk programma voor komen. Nadere adviezen hieromtrent zijn te vinden in de aanbevelingen 11-15.

Hoofdstuk 6

De belangrijke rol van het CGC in het proces is hierboven al aangehaald en wij hebben een aantal aanbevelingen hieromtrent gedaan, met name over het probleem van de deelneming van kleinere en misschien minder orthodoxe onderzoekeenheden aan het gehele programma

en het gevaar dat het CGC op een of andere mysterieuze manier kan worden beschouwd als een soort gesloten club waarvan kleinere en minder gevestigde eenheden zich buitengesloten voelen. Wij gaan er niet van uit dat dit zo is, maar aangezien een aantal mensen dit wel vindt moet hieraan iets worden gedaan, bij voorbeeld door het toelaten van meer leden tot het CGC en/of door roterend lidmaatschap of aanstelling voor een bepaalde termijn. Wij hebben al gewezen op kritiek op bepaalde boekhoudprocedures en ofschoon dit misschien een vrij onbelangrijke zaak lijkt, kan zij toch grote gevolgen hebben. Problemen met het moreel van het personeel en moeilijkheden om personeel met bepaalde deskundigheden, waaronder ook 'junior staff', te behouden kunnen toenemen als er grote vertragingen zijn in uitbetalingen, zeker aan kleine eenheden. Dit wordt in het desbetreffende hoofdstuk besproken en aangehaald in aanbeveling 25.

AANBEVELINGEN

Algemeen

1. Het huidige programma is doeltreffend en wij bevelen aan de steun ervoor ten minste op het huidige peil te handhaven. De manier waarop het programma wordt beheerd is succesvol, maar de werklast voor het personeel van de Commissie moet worden verlicht.

2. De laatste twintig jaar hebben wetenschap en wetenschappers veel vertrouwen bij het publiek ingeboet. Het is niet duidelijk hoe dit door het programma kan worden verholpen, tenzij door het blijven leveren van degelijk wetenschappelijk werk. Toch vinden wij het erg belangrijk dat andere directoraten wordt gewezen op de noodzaak van een krachtig programma op het gebied van informatieverstrekking, onderzoek en onderwijs, in een poging het huidige onbegrip en de angst voor stralingsrisico's weg te werken. Bijzondere aandacht moet worden geschonken aan de voorlichting aan groepen zoals huisartsen, die misschien wel de grootste invloed op de publieke opinie en de kennis ter zake hebben maar zelf wellicht onvoldoende inzicht hebben.

3. Er moet een toerbeurt komen voor het lidmaatschap van het CGC en in het bijzonder moet erop worden gelet hoe kleinere onderzoekorganisaties meer positief kunnen worden vertegenwoordigd.

Onderzoek

4. Onderzoek op het gebied van de biologische dosimetrie moet ook verder als een prioritair gebied worden beschouwd.

5. Er moet een sterke basis van fundamenteel onderzoek gehandhaafd blijven als grondslag voor het brede gamma van activiteiten op het gebied van toegepast onderzoek.

6. Bijzondere aandacht moet worden geschonken aan onderzoek naar de effecten van lage doses en lage dosestempi en het belang van dergelijke studies voor het overheidsbeleid en de publieke opinie.

7. Verdere nauwe samenwerking met de Verenigde Staten bij de inspanningen om een radiobiologische database te ontwikkelen wordt ten volle onderschreven.

8. Er moeten initiatieven worden genomen om ervoor te zorgen dat inzichten en technologie op het gebied van de moleculaire biologie worden toegepast op onderzoek op het gebied van de stralingsbescherming.

9. Verdere inspanningen om epidemiologische gegevens bijeen te brengen worden sterk aangemoedigd ten einde de statistische waarde van het onderzoek te verhogen. Kleinschalige studies die onvoldoende gewicht in de schaal leggen moeten worden ontmoedigd.

10. Over de mogelijke gevolgen van blootstellingen aan radon voor de gezondheid bestaat een moeilijk oplosbaar conflict tussen gegevens en interpretatie. Er wordt aanbevolen hoge prioriteit aan dit programma-onderdeel toe te kennen.

Opleiding

11. Er moeten aparte regelingen worden getroffen voor de financiering van opleiding. In vorige evaluaties is ook al gewezen op de noodzaak om geregeld bekwame wetenschappers aan te trekken voor het gebied stralingsbescherming en wij willen dit standpunt onderschrijven. Uit ons rapport blijkt dat er al een grote inspanning is gedaan maar deze moet worden volgehouden en wellicht nog opgevoerd. Er moeten duidelijk omschreven middelen voor opleiding worden uitgetrokken (los van de middelen voor onderzoek) en er moet een zichtbare en actieve beheersstructuur voor opleiding komen, waarbij het personeel en de Lid-Staten zijn betrokken. Activiteiten in het kader van het onderzoekprogramma mogen hiermee niet worden verward.

12. Activiteiten van het CGC op het gebied van opleiding en onderwijs moeten worden geharmoniseerd met soortgelijke activiteiten van andere internationale organisaties en wetenschappelijke instanties (b.v. IAEA, IAO, WGO, IRPA), met betrekking tot zowel het lesmateriaal als de doelgroepen.

13. De mogelijkheid van de afgifte van een in geheel Europa erkend certificaat na succesvolle deelname aan een georganiseerde opleidingscursus lijkt nu al een dringende noodzaak. Dit wordt een belangrijke aangelegenheid voor bovengenoemde nieuwe beheersstructuur voor de opleiding.

14. Er moet meer aandacht worden gegeven aan opleidingscursussen voor gevestigde wetenschappers (opleiding van opleiders) en een structuur waarbij de nationale organisaties de aldus verkregen kennis overdragen aan individuele gebruikers of aan werkers op het gebied van de stralingsbescherming.

15. Er moet adequaat gebruik worden gemaakt van regelingen voor bursalen, ten einde het bijwonen van door nationale autoriteiten gegeven, erkende opleidingscursussen aan te moedigen. De EU moet een register van dergelijke cursussen bijhouden.

Programmabeheer

16. Het gebruik van associatie-overeenkomsten moet worden uitgebreid.

17. Wij steunen de voorstellen voor een verduidelijking van de rol van de coördinatoren en voor meer samenwerking tussen de coördinatoren met betrekking tot sommige aspecten van het programma.

18. Ofschoon wij enthousiast voorstander zijn van multinationale projecten, vinden wij het ook wenselijk dat bekwame academici die niet gemakkelijk in dergelijke schema's zijn in te passen toch steun kunnen vragen en eventueel ook krijgen.

19. Wij bevelen verdere steun aan voor EULEP, EURADOS en IUR en hun rol in de totstandkoming van samenwerkingsteams.

Samenwerking

20. Studies van besmetting en overbestraling van mensen mogen niet beperkt blijven tot of overheerst worden door de gevolgen van het ongeval van Tsjernobyl. Ook eerdere ongevallen van diverse aard moeten worden bestudeerd, aangezien daarover enorm waardevol materiaal moet bestaan. Bijzondere aandacht moet worden geschonken aan de beoordeling en behandeling van het acute bestralingssyndroom en andere niet-stochastische effecten.

21. De uitwisseling van wetenschappers tussen het GOS en de EU moet worden gesteund.

22. Het post-Tsjernobyl-gedeelte van het programma en de activiteiten met betrekking tot Midden- en Oost-Europa moeten over een of twee jaar afzonderlijk worden geëvalueerd, zodra er zinvolle resultaten kunnen worden voorgelegd.

23. Meer aandacht moet worden besteed aan studies van de psychosociale gevolgen van maatregelen zoals het onderbrengen in schuilkelders en evacuatie na besmetting van het milieu. Studies van deze aard kunnen van nut zijn bij het beoordelen van kosten/baten-overwegingen in verband met dergelijke maatregelen.

Administratie en financiering

24. De steun voor afzonderlijke projecten mag niet worden verlaagd. Ofschoon financiële beperkingen onvermijdelijk zijn, zijn wij toch van mening dat de huidige omvang van het programma het levensnoodzakelijke minimum is en dat het eenvoudig verlagen van het bedrag voor afzonderlijke projecten om daarmee meer projecten te kunnen steunen geen vooruitgang betekent.

25. Er moet worden gezocht naar middelen om de aanlooptijd voor het opstellen en opstarten van projecten te verkorten.

26. Wij herhalen eerdere aanbevelingen betreffende de noodzaak om de banden tussen het programma stralingsbescherming en andere onderzoekeenheden in DG XII en andere

directoraten-generaal aan te halen. Daartoe is wellicht een iets formeler mechanisme nodig dan het huidige.

27. Het systeem van beoordeling door vakgenoten (peer review) moet opnieuw worden bekeken om te zorgen voor een zo groot mogelijke doorzichtigheid en het programma open te stellen voor kleinere onderzoekeenheden en innoverende of minder orthodoxe wetenschappelijke benaderingen. Deze aanbeveling sluit aan op een aanbeveling van een eerder panel, waarop niet is ingegaan.

28. De resultaten van de onderzoekwerkzaamheden moeten voortdurend onder de aandacht worden gebracht van diegenen die zich met normalisatie bezighouden. De banden met DG XI moeten worden aangehaald en meer worden geformaliseerd. Zo kan worden gedacht aan een formele eis om overleg te plegen in het kader van de procedures van artikel 31 en te registreren dat dergelijk overleg heeft plaatsgehad.

29. Er wordt aangedrongen op nauwe samenwerking met het onderzoekprogramma op het gebied van stralingsdosimetrie en -instrumentatie van het Amerikaanse Department of Energy (DOE), in het bijzonder nu de leiding van het onderzoekprogramma inzake gezondheid en milieu van het DOE kennelijk begonnen is de prioriteiten opnieuw te bekijken.

30. Ook de samenwerking met andere onderzoekprogramma's buiten de Europese Unie moet worden voortgezet en uitgebreid.

RESUMO

O capítulo 1 inclui uma descrição sucinta do mandato do Painel. As suas conclusões constam dos capítulos que se seguem. Ao presente resumo seguem-se recomendações específicas. As conclusões de carácter geral podem ser assim resumidas:

- O programa 1990-1992 continuou a evoluir de modo satisfatório, e, nalgumas áreas, registaram-se mesmo progressos notáveis. O programa foi adaptado às novas necessidades e aos avanços no domínio dos conhecimentos, foi possível comprovar a adequação dos seus objectivos e a investigação conduziu a resultados úteis.

- Registaram-se alterações significativas na abordagem adoptada pelo programa, designadamente o desenvolvimento de contratos multinacionais e o alargamento a estudos ligados ao trabalho em países da Europa Oriental e ao estabelecimento de laços com programas de investigação extracomunitários.

- O programa foi gerido eficazmente. O recurso a consultores peritos na matéria não foi integralmente aproveitado, como no que respeita à avaliação por pares das propostas de investigação, e limita-se em grande parte à participação de alguns deles no CGC.

- É necessária uma vigilância contínua para assegurar que os resultados da investigação sejam tomados em consideração na concepção das políticas sociais e legislativas da UE. As recomendações abordam algumas questões organizativas integradas nesta área.

- É também necessário que a administração e a organização financeira de apoio ao programa seja mais expedita e "convivial".

Os capítulos que se seguem contêm descrições mais detalhadas sobre questões específicas, designadamente:

Capítulo 3

O equilíbrio do programa em termos genéricos pouco variou com o tempo e elaborámos recomendações sobre algumas áreas em que pareceria justificar-se uma maior prioridade. Tal é o caso das lesões agudas por radiações e do significado da exposição não ocupacional ao radão.

Importa que os trágicos e dramáticos acontecimentos de Chernobil não sejam a questão predominante nos debates relativos à protecção contra as radiações. Chamamos a atenção para o facto de acidentes menos espectaculares (como fontes perdidas ou roubadas, etc.) terem causado mais mortes e lesões do que os reactores e as respectivas avarias. Importa igualmente reconhecer que, em termos sociais, a investigação no domínio da protecção contra as radiações tem implicações muito mais vastas do que as meras questões de segurança e saúde ligadas ao funcionamento da indústria nuclear.O

recurso cada vez mais frequente a contratos multinacionais causou um enorme volume de trabalho ao pessoal da Comissão e aos coordenadores, pelo que nos congratulamos com as medidas destinadas a clarificar a missão destes últimos. O apoio e orientação do CGC continua a ser essencial e analisámos esta e outras questões relativas ao programa nas recomendações 16 a 30.

As recomendações 2 e 23 reflectem a nossa preocupação pelo facto de, a despeito de muitos anos de investigação e estudos frutuosos e de muitas tentativas de consciencialização e informação do público, a actual situação ser considerada insatisfatória, podendo ser eventualmente necessárias abordagens psicossociais e de comunicação diferentes. Trata-se de um problema que ultrapassa o âmbito da protecção contra as radiações e se inscreve no domínio global das dúvidas e da apreensão do público sobre a ciência e a tecnologia avançadas em termos globais.

Capítulo 4

A evolução dos programas pós-Chernobil e PECO foi simultaneamente importante e significativa. Apoiamos inteiramente o intercâmbio de cientistas entre a CEI e a União Europeia e os programas parecem estar a ter uma evolução satisfatória. De momento, porém, não existem ainda resultados suficientes para que possamos avaliar estes trabalhos. Recomendamos que, dentro de um ou dois anos, quando houver resultados e relatórios suficientes, se proceda a uma avaliação mais aprofundada desta área. Os trabalhos subsequentes integrados no programa pós-Chernobil irão carecer de uma grande integração quer de projectos específicos quer das equipas dos projectos; foram-nos dadas boas garantias de que esta questão está a ser claramente abordada.

Capítulo 5

A exemplo do que sucedeu nos relatórios prévios, prestámos especial atenção à formação. É importante que haja uma interacção entre programas nacionais de formação e as actividades a nível comunitário e, neste domínio, não se nos afigura necessária uma forte coordenação, por intermédio de mecanismos claramente definidos. Talvez devesse ser mais divulgada. O orçamento para a formação deveria ser claramente distinguido das despesas de investigação. Verificou-se ocasionalmente uma tendência para que várias facetas dos programas multinacionais fossem fundamentadas com base na sua vertente formação. Este facto comporta perigos e somos de opinião que, embora o intercâmbio de cientistas e outras actividades análogas sejam extremamente importantes, a participação no programa de investigação deveria depender em grande medida da capacidade de se prestar um contributo valioso para os resultados do programa e não de eventuais benefícios futuros. A formação e desenvolvimento por intermédio da partilha de instalações com outros países é obviamente importante e deveria estar bem definida. As recomendações 11-15 são recomendações mais pormenorizadas.

Analisámos acima o importante papel desempenhado neste processo pelo CGC e formulámos algumas recomendações a ele relativas, designadamente sobre a problemática da participação em todo o programa de unidades de investigação de menor dimensão e eventualmente menos ortodoxas, bem comosobre o perigo de se criar a imagem de que, sob forma encapotada, o CGC se poderia tornar uma espécie de clube em relação ao qual as unidades de menor dimensão ou com menor prestígio se pudessem sentir excluídas. Não é essa a nossa opinião, embora, uma vez que se trata de uma ideia presente nalgumas mentes, se nos afigure que se trata de uma questão a, se possível, solucionar, quer através do alargamento do número de membros do CGC, quer através da rotação ou da nomeação por um prazo fixo para este organismo. Referimos já as críticas relativas a determinados procedimentos contabilísticos, as quais, apesar de se poderem interpretar como uma questão de somenos importância, têm consequências graves. Se se verificarem atrasos de pagamentos, nomeadamente às unidades de menor dimensão, levantar-se-ão grandes problemas de moralização do pessoal e de conservação de pessoal com competências específicas, incluindo o mais jovem. Este problema é abordado neste capítulo e está reflectido na recomendação 25.

RECOMENDAÇÕES

Gerais

1. O presente programa é eficaz e recomendamos a sua prossecução com pelos menos os actuais meios disponíveis. A actual gestão do programa é também eficaz, muito embora recomendemos a redução da carga de trabalho do pessoal da Comissão.

2. Nas duas últimas décadas, verificou-se uma grande diminuição da confiança do público na ciência e nos cientistas. Afigura-se difícil identificar outros modos de o programa solucionar este problema que não sejam a prossecução de trabalhos científicos válidos. Todavia, consideramos igualmente ser extremamente importante chamar a atenção das outras Direcções-Gerais para a necessidade de um programa vigoroso de informação do público, investigação e educação, por forma a que se abordem a incompreensão e o medo actuais sobre os perigos das radiações. Dever-se-ia prestar especial atenção à educação de grupos, como os clínicos gerais, que exercem maior influência na imagem e na compreensão por parte do público, cujos conhecimentos básicos poderão ser limitados.

3. Deveria existir um sistema de rotação dos membros integrados no CGC e dever-se-ia analisar o modo de representar melhor no seu seio as organizações de investigação de menor dimensão.

Investigação

4. A investigação no domínio da dosimetria biológica deveria continuar a ser considerada uma área prioritária.

5. Deverá manter-se uma sólida base de investigação fundamental que contribua para a abordagem de uma vasta gama de necessidades em termos de investigação aplicada.

6. São muito importantes estudos sobre os efeitos das baixas doses e de baixas taxas de dose, bem como o significado destes estudos em termos de política e compreensão por parte do público.

7. Recomenda-se vivamente a prossecução da ligação estreita à iniciativa dos Estados Unidos de desenvolvimento de uma base de dados radiobiológicos.

8. Deverão ser tomadas medidas para assegurar que os novos conhecimentos em termos de biologia molecular e as novas tecnologias sejam aplicados na investigação relativa à protecção contra as radiações.

9. Deverão ser fortemente incentivadas novas iniciativas tendentes à concentração de dados epidemiológicos, por forma a aumentar o valor estatístico da investigação. Há que desincentivar estudos em pequena escala.

10. Um dos domínios em que se verificam contradições entre dados e interpretação é o das possíveis consequências para a saúde da exposição ao radão. Recomendamos que seja dada elevada prioridade a esta parte do programa.

Formação

11. Há que criar procedimentos de financiamento específicos no que respeita à formação. Em avaliações anteriores foi realçada a necessidade de atrair um caudal regular de cientistas habilitados para o domínio da protecção contra as radiações, com a qual concordamos. O nosso relatório comprova que muito foi feito, embora esta deva ser uma iniciativa a prosseguir e a provavelmente intensificar. Deveria existir um orçamento de formação claramente definido (não integrado no da investigação), bem como uma estrutura de gestão da formação que abranja o pessoal e os Estados-membros, a qual deve ser visível e activa. As actividades integradas no programa de investigação não devem ser confundidas com estas iniciativas.

12. As actividades de educação e formação da CCE deveriam ser harmonizadas com actividades análogas de outras organizações internacionais e organismos científicos (como a AEEA, a BIT, a OMS e a IRPA), no que respeita quer aos materiais de ensino, quer aos grupos-alvo.

13. Afigura-se já uma necessidade premente a atribuição de um certificado de participação bem sucedida em cursos de formação organizados, o qual deveria ser reconhecido a nível europeu. Esta questão deveria ser urgentemente analisada pela nova estrutura de gestão da formação.

14. Deveria atribuir-se maior ênfase aos cursos de formação organizados para cientistas de elevado nível (ensino dos professores) e deixar que as organizações nacionais veiculem aos utilizadores individuais ou aos profissionais da protecção contra as radiações os conhecimentos desta forma adquiridos.

15. Dever-se-iam utilizar todos os procedimentos relativos a bolsas de estudo para fomentar a participação em cursos de formação reconhecidos geridos pelas autoridades nacionais. A União Europeia deveria dispor de um registo de tais cursos.

Gestão do programa

16. Deveria intensificar-se o recurso a acordos de associação.

17. Apoiamos as propostas tendentes à clarificação do papel dos coordenadores e à maior participação destes em determinados aspectos do programa.

18. Muito embora apoiemos entusiasticamente os projectos multinacionais, gostaríamos que universitários com talento que não possam ser facilmente integrados em tais esquemas pudessem procurar e, se adequado, obter apoios.

19. Recomendamos a prossecução dos apoios ao EULEP, EURADOS e UIC e ao seu papel na criação de equipas em colaboração.

Colaboração

20. Os estudos de contaminação e sobrexposição humana não devem limitar-se nem incidir sobretudo nas consequências do acidente de Chernobil. Este estudos devem igualmente abranger incidentes prévios de vários tipos, uma vez que se encontra disponível material extremamente valioso. Deverá prestar-se ainda mais atenção à avaliação e tratamento do síndrome agudo de irradiação e a outros efeitos não estocásticos.

21. Deveria ser apoiado o intercâmbio de cientistas entre a CEI e a União Europeia.

22. A componente pós-Chernobil do programa e as acções PECO deveriam ser separadamente avaliadas dentro de um ou dois anos, logo que possam ser apresentados resultados significativos.

23. Dever-se-ia prestar maior atenção aos estudos das consequências psicossociais de medidas como o alojamento e a evacuação na sequência da contaminação do ambiente. Estudos desta natureza irão contribuir para avaliar a relação custo-benefício de tais medidas.

Administração e financiamento

24. O grau de apoio a projectos específicos não deveria diminuir. Muito embora se reconheça a necessidade de uma disciplina financeira, consideramos que o actual âmbito do programa é o mínimo necessário para a sua viabilidade e que a simples redução do montante atribuído a projectos específicos para que se possam apoiar mais projectos não é a opção correcta.

25. Dever-se-ão encontrar fórmulas para limitar os atrasos na elaboração e arranque dos projectos.

26. Recomendamos novamente o reforço da interacção entre o programa de protecção contra as radiações e outras unidades de investigação da DG XII e de outras Direcções-Gerais. Para tal, poderá ser necessário um mecanismo algo mais formal do que o já existente.

27. Deveria analisar-se o sistema de avaliação por pares, por forma a assegurar, na medida do possível, a transparência e a facilitar o acesso das unidades de investigação de menor dimensão ao programa, bem como abordagens mais inovadoras e menos ortodoxas. Esta recomendação vem na sequência de uma recomendação não implementada formulada por um Painel anterior.28. Dever-se-iam prosseguir as iniciativas tendentes a fazer chegar os resultados das actividades de investigação a quem esteja envolvido na elaboração de normas. As ligações com a DG XI devem ser mais sólidas e mais formais. Dever-se-ia analisar a oportunidade da obrigação formal de consulta dentro do âmbito dos procedimentos do artigo 31° e do registo da realização de tais consultas.

29. Recomenda-se uma interacção estreita com o programa de investigação do Department of Energy (DOE) dos Estados Unidos no domínio da dosimetria das radiações e da instrumentação, nomeadamente durante a actual fase de aparente reavaliação das prioridades da gestão do programa de investigação sanitária e ambiental da DOE.

30. Deveria ser prosseguida e intensificada a interacção com outros programas de investigação externos à União Europeia.

CHAPTER 1

INTRODUCTION

All specific research programmes of the EC are usually implemented over a period of five years. Each specific programme is a part of the Framework Programme, an umbrella programme for Community Research and Technological Development. Currently, it is the period of the Third Framework Programme (1990-1994) and the Commission is preparing the implementation of the Fourth (1994-1998).

Radiation Protection research has been an activity of the European Communities since 1958. Following the last five year Programme in Radiation Protection (1985-1989), the Programme management was confronted with a substantial cut in available funds. 21.1 MECU were allocated, sufficient to cover little more than 50% of the 1985-1989 research activities. In order to be able to continue funding research projects, it was decided to implement a two year Programme (1990-1991) [1] (Table 1).

TABLE 1

Distribution by countries: (1990-1991 Programme)

Country	Accepted Projects	Distribution (%)	KECU Given	Distribution (%)
BELGIUM	23	8,10	1.444	6,85
GERMANY	45	15,85	4.365	20,73
DENMARK	14	4,93	.705	3,35
SPAIN	6	5,63	1.133	5,38
FRANCE	35	12,30	3.414	16,21
UNITED KINGDOM	55	19,36	4.047	19,22
GREECE	10	3,52	.437	2,05
IRELAND	13	4,55	.746	3,54
ITALY	17	5,98	1.328	6,31
LUXEMBURG	1	0,35	.080	0,38
NETHERLANDS	2	8,80	1.692	8,04
PORTUGAL	6	2,10	.236	1,12
TOTAL CEC	260	91,51	19.622	93,20
SWEDEN	18	6,39	.660	3,14
I.O + S.C.G.	6	2,10	.771	3,66
TOTAL	**284**	**100,00**	**21.053**	**100,00**

[1] Council Decision of 20 June 1989.
Official Journal of the CEC (N° L200/50).

This two year period brought the Radiation Protection Research Action into synchrony with the Third Framework Programme (1990-1994). The 1992-1993 Radiation Protection Research Action (17.6 MECU - Table 2) is implemented under the Nuclear Fission Safety heading [2] of the Third Framework Programme (Figure 1).

TABLE 2

Distribution by countries (1992-1993 Programme)

Country	Accepted Projects	Distribution (%)	KECU Given	Distribution (%)
BELGIUM	21	6,56	1.062	6,03
GERMANY	59	18,44	3.795	21,55
DENMARK	14	4,38	.590	3,35
SPAIN	22	6,88	1.073	6,09
FRANCE	41	12,81	2.508	14,41
UNITED KINGDOM	68	21,25	3.678	20,89
GREECE	8	2,50	.360	2,04
IRELAND	8	2,50	.250	2,13
ITALY	21	6,56	1.074	6,10
LUXEMBOURG	1	0,31	.060	0,34
NETHERLANDS	27	8,44	1.377	7,82
PORTUGAL	5	1,56	.180	1,02
TOTAL CEC	295	92,19	16.132	91,63
SWEDEN	19	5,94	.668	3,80
I.O. + S.C.G.	6	1,87	.805	4,57
TOTAL	**320**	**100,00**	**17.605**	**100,00**

International Organisation (I.O.) & Scientific Collaboration Groups (S.C.G.) include: ICRU, ICRP, IARC, IUR, EURADOS, EULEP

In 1991 and following extensive negotiation periods with the Soviet Union and later with the Commonwealth of Independent States (CIS) that succeeded it, the Commission launched several projects in Radiation Protection Research in collaboration with selected scientific institutions of the CIS republics (Belarus, Russia and Ukraine). Ten such projects are currently underway.

The Community cooperative actions involving Radiation Protection Research also include the countries of Central and Eastern Europe (PECO countries). Most joint projects started in late 1993.

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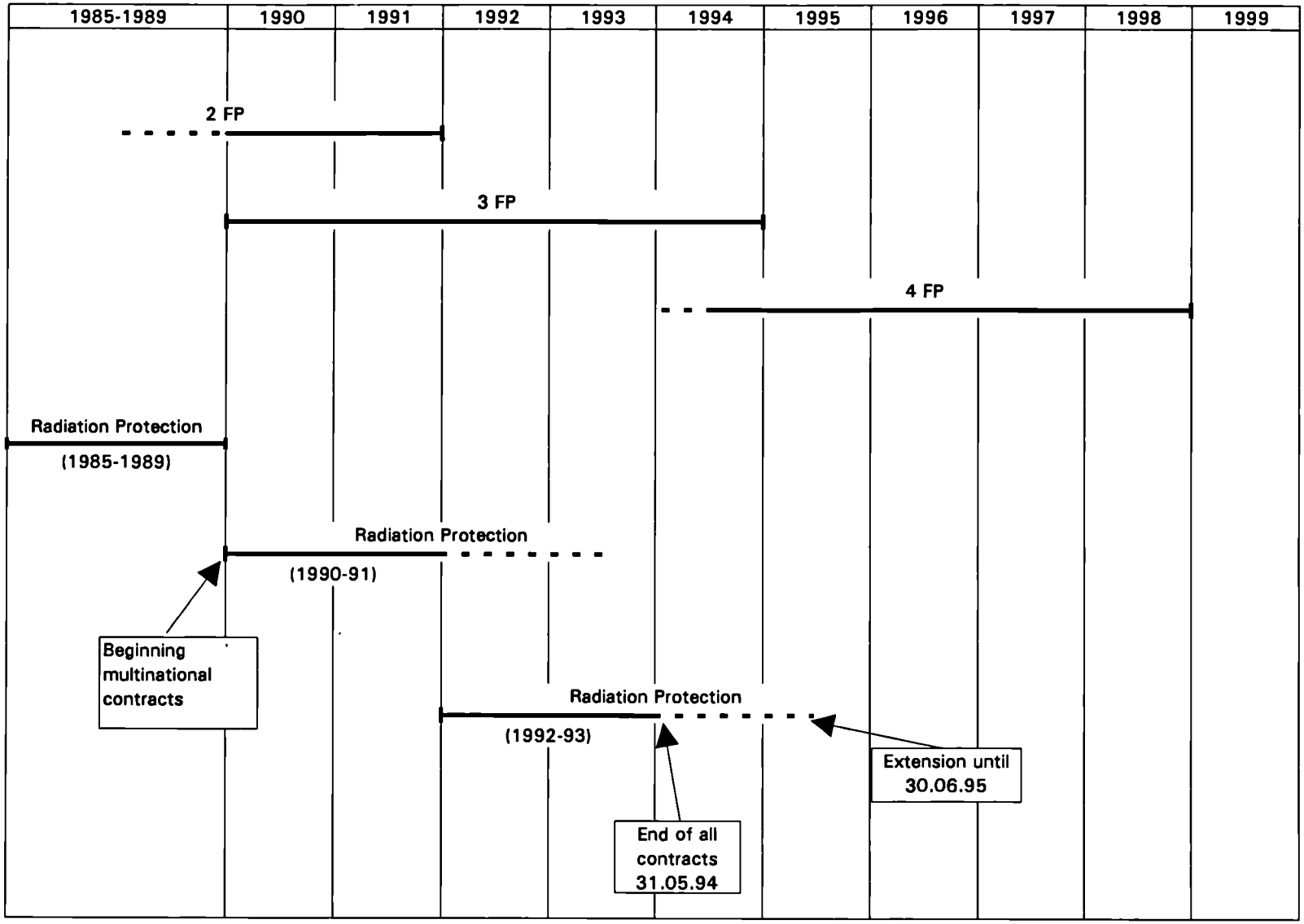
[2] Council Decision of 28 November 1991.
Official Journal of the CEC (N° L336/42).

FIGURE 1


1985-1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2 FP
3 FP
4 FP
Radiation Protection
(1985-1989)
Radiation Protection
(1990-91)
Beginning multinational contracts
Radiation Protection
(1992-93)
Extension until 30.06.95
End of all contracts 31.05.94
: Programme duration
: Programme extension

CHAPTER 2

EVALUATION METHODOLOGY

This is the third in a series of independent evaluations of the Radiation Protection Research Programmes of the Commission. It follows on and has drawn upon the previous report (Research Evaluation Report No. 37 EUR 12145).

The terms of reference for the Panel made it clear that they were appointed as independent experts in fields covered by the Programme and that they did not represent particular organizations or countries. The terms went on to say -

"The panel is to assess:

- the scientific and technical achievements of the programmes taking into account their original objectives and milestones, and whenever relevant of changed circumstances;

- the quality and practical relevance of the results including (whenever relevant) commercial development and exploitations, and possible spin-offs;

- the effectiveness of management and of the use of resources;

- the programmes' contribution to the development of Community policies and to the social and economic development of the Community;

- the benefits resulting from the implementation of the programmes at the Community level (community added value).

Quantitative indicators will be used whenever appropriate.

The panel's assessment of achievements and benefits should take into account the expenditures applied.

The evaluation should lead to recommendations of the following:

- the future continuation or alteration of radiation protection research by the Community;

- the management of the programme;

- the use of research results by organizations carrying out the work;

- the transfer of technology to other organizations, by movements of personnel, by licensing, and by other means".

The report of the Panel has been prepared for the information and guidance of the Council of Ministers, the European Parliament, the Programme Managers of the Commission, the participating scientists and users of the results of the programme, including decision-makers in the Member States.

The evaluation by the Panel is based on an assessment of the programme's scientific scope and priorities, the scientific originality and the practical applications. It was not the business of the Panel to evaluate individual research projects in detail though they had access to such evaluations carried out under the Commission's machinery.

Between February 1993 and January 1994 the Panel met in Brussels on eight occasions and in Paris on one. Originally, it was our intention to hold a meeting in Germany and also to visit the CIS. For various reasons these intentions were not realised, but as the report indicates, alternative methods were used to obtain the information that would have been sought on these two occasions. A vast amount of programme material (various publications, project reports, etc.) was made available to us and, as a first step to examine more closely the mechanisms of carrying out these projects, the Panel decided on an in-depth examination of a small number of randomly selected projects. The Evaluation Unit, and the Programme Managers made all the necessary documents available to the Panel Members. Also at the first meeting, presentations were made by the Head of the Programme and by Programme Managers and there have also been subsequent amplification and replies to questions from these sources.

In general, the Panel operated as a unit. However, in addition to these Panel meetings, there were a large number of interviews carried out by individual members of the Panel in their own countries and with representatives or individuals from countries involved in the programme. It was made clear, both at the Panel meetings and in these individual discussions that all matters raised are, however, covered in the context of the report but without attribution to individuals.

Selected CGC (Radiation Protection Programme Management and Co-ordination Advisory Committee) members, project co-ordinators and partners were interviewed by the Panel in their meetings. Since the Panel considered the EC/CIS co-operation as a very important element of the Programme, one meeting was devoted to interviews with scientists from the CIS who participate in the joint EC/CIS projects as CIS co-ordinators.

Some members of the Panel attended, as observers, a CGC meeting where the future of the Programme was under discussion. This was considered an important activity because of the central role in the administration of the Programme which is filled by the CGC. Other CGC documents were also made available for study.

While the time span of the projects we were instructed to consider was limited, we have of course, looked back to previous reports and had some regard to the future direction in which the Programme was heading in framing our report.

In our original terms of reference we were instructed to produce a report which would be published by the Commission. We were also informed that if we wished we could produce a confidential annex for the Directorate General of DGXII if that was felt to be desirable and necessary. For the sake of openness and completeness we record that no such annex has been prepared or was felt necessary.

CHAPTER 3

PROGRAMME DEVELOPMENT AND EVALUATION

In this chapter we will discuss the organizational progression of the Radiation Protection Research Programme from the 1985-1989 format to that of the 1990-1992 period. We shall provide an assessment of the significance of that reorganization including the consequent impact on programme formulation, presentation, and justification. This chapter also highlights some of the significant scientific achievements that, in the evaluation panel's assessment, were accomplished by the research programme during the evaluation period. In this request, the panel drew heavily from the following documents:

1) Scientific Evaluation Report, Radiation Protection [1];
2) Evaluation of the Second Framework Programme 1987-1991 [2]; and
3) Radiation Protection Research and Training Programme 1990-91: Catalogue of contracts [3].

In brief, the panel's evaluation has concluded that research progress during this period has been highly meritorious. The panel has also specifically examined the multinational research contract approach for support of research requirements and will present a number of findings and recommendations.

1. Programme Evolution

The 1985-1989 Radiation Protection Research Programme was distributed among five sectors plus the post-Chernobyl actions, while the 1990-1991 and 1992-1993 periods were recategorized into three major subject areas each with their own sub-areas. These programme descriptions are presented in Table 3.

The relative allocation among the several sectors and study areas remained largely unchanged between the two periods (Figures 2 and 3). The panel feels this revised structure enables a clearer presentation of the scope and balance of the research programme by categorizing the activities into three major areas of research interest. In the panel's view, this provides an improved format for development and evaluation of programme priorities. The new format also provides an enhanced structure for encouraging and fostering interaction among research investigators in neighbouring scientific fields.

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[1] Internal Document XXIV/6, 1992.

[2] Document prepared by the CGC (Prof. Dr. W. Gössner - rapporteur) for the evaluation of the EC Second Framework Programme, 1992. (XXIII/7)

[3] Report EUR 13387, CEC, 1991.

TABLE 3 : Programme Subject Areas

(Reprinted from Document XXIII/7, Prof. Dr. W. Gössner - Rapporteur)

A.	Human exposure to radiation and radioactivity	
	1.	Measurement of radiation dose and its interpretation
	2.	Transfer and behaviour of radionuclides in the environment
B.	Consequences of radiation exposure to man; their assessment, prevention and treatment	
	1.	Stochastic effects of radiation
	2.	Non-stochastic effects of radiation
	3.	Radiation effects on the developing organism
C.	Risk and management of radiation exposure	
	1.	Assessment of human exposure and risks
	2.	Optimization and management of radiation protection

2. Programme Coordination

The 1990-1991 and 1992-1993 time periods saw the introduction of multi-national research contracts as a new and distinct mode of providing financial support to meet identified research requirements. From a range of interviews and technical discussions, the panel observed that two types of multi-national contracts have evolved. On the one hand, research investigators with similar or closely related technical interests found it to be scientifically valuable to arrange periodic meetings in order to discuss progress, pitfalls, and promising avenues for future studies. It thus became beneficial, not only for the individual investigators but also for European science in general, for these research groups to join together into a multi-national research team, to identify a coordinator for each team, and to collectively propose and establish an integrated programme under a multi-national contract. In this instance the coordinator's role is just that: to assemble input from the several partners for preparation of proposals and reports, to schedule and develop agenda for periodic meetings and to accomplish other coordination activities for the research team.

On the other hand, some multi-national research projects are formulated to bring together distinct research expertise from different laboratories in order to focus these diverse talents on to a specified research objective. Each team member would address a specific component of the overall research programme such that together the team comprises a multi-dimensional attack on the research objective. In this instance, the coordinator carries a much greater burden in that he or she must assure that the full range of required technical expertise is brought into the team. The coordinator has a demanding role in the formulation of the research objectives, in assuring complete and high quality input from all team members in the initial proposals, and in achieving timely and complete involvement of the full team in the preparation of reports and publications. The time and energy required by the coordinator to successfully carry out these responsibilities can be substantial indeed and may necessitate

Figure 2 : Distribution of funds by Subject Areas (1990-1991)

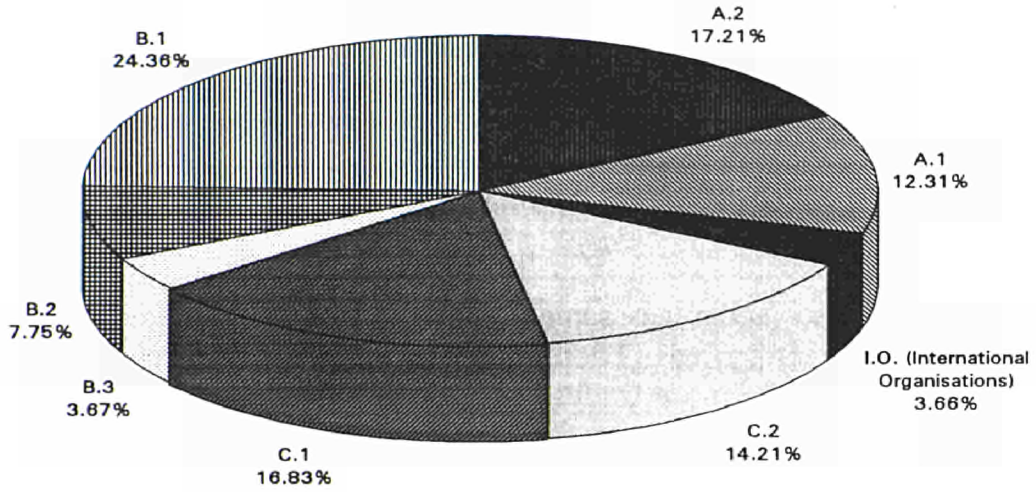
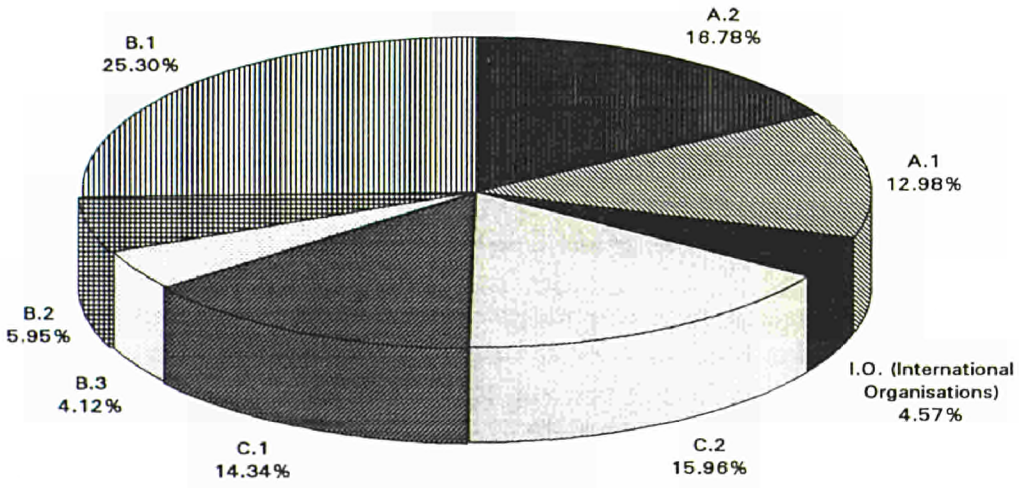


Figure 3 : Distribution of funds by Subject Areas (1992-1993)



a reduction in the coordinator's own research activities to assure a successful multi-national effort. Furthermore, specific resources, both financial and personnel, may be justified in order for the coordinator's activities to be carried out efficiently and effectively.

The multi-national research contract offers a number of advantages to the European scientific community. It assures a close technical interaction among investigators with similar scientific interests to the benefit of both the scientists and the science. It brings diverse technical expertise to bear on specific research needs that may not be possible within a single laboratory. It accomplishes a sense of unity within the European scientific community. It will encourage and strengthen radiation research in the smaller countries and in the smaller research institutions which can only be of value to the further development of European science.

However, the panel also recognizes some potential concerns that may accompany the multi-national research contract process. There may be a trend for research institutions to develop cooperative activities in the more traditional radiation protection research areas because of familiarity with the science and among the scientists. Particular attention may be required by the technical staff of the Commission to assure that the newer challenges such as applying the technology and insights of molecular biology to the issues of radiation protection are met. In addition, the multi-national research contract approach does not provide an opportunity for the Commission to respond to creative, innovative, individual investigator initiated research proposals. It could be argued that the Commission should foster the broader, European wide research issues, responsibilities, and opportunities; with individual countries responding to individual investigator proposals. However, some European countries may not be in a strong position to respond to these proposals as effectively as others. Moreover, the panel strongly feels there should be a modest but viable capability within the Commission's radiation protection research programme for responding positively to such creative, high risk but potentially high return research proposals.

3. Programme Discussion

In this section the panel provides a discussion of research progress and research highlights within the three major subject areas. A detailed discussion of the Chernobyl programme is provided in Chapter 4.

3.1 Human Exposure to Radiation and Radioactivity

The radiation dosimetry and instrumentation programme comprises the physical research foundation which provides the basis for the development of radiation risk estimates and for the establishment of radiation health protection guidelines and radiation exposure standards. Continued refinement and advancement of radiation instrumentation and dosimetry technology, leading to further improvement of risk assessment and radiation protection methodology, will ensure enhanced occupational protection for radiation research and nuclear industry workers as well as the general population, and will provide enhanced assurance to the public on issues of radiation safety.

The panel assess the research in this study area to be well balanced in terms of practical and fundamental activities. Current areas of emphasis address new dosimetric concepts and quantities, area and personal instrumentation, internal dosimetry and calculational methods for dosimetry. Tissue equivalent proportional counter technology for area monitoring has been advanced substantially with enhanced energy response and spectral information; and commercial instrumentation is now available. Marked progress has been made in instrumentation for beta dosimetry with improved beta radiation calibration facilities and the technical determination that a depth of 50 to 100 μm is appropriate for skin dose equivalent measurements. Important information on particle deposition and clearance has contributed significantly to improved internal dosimetry for the lung. Other internal dosimetry research efforts involving stable isotope tracers are also making important contributions to ICRP deliberations.

A continued effort in further research and development of physical dosimetry and radiation instrumentation technology is strongly recommended particularly in areas of neutron, mixed field, and internal dosimetry research. An issue of particular concern at the present time is the re-examination of dosimetry research currently underway at the United States Department of Energy (DOE). Over the past several years a close relationship has been established between the Commission and DOE, and the planning and formulation of the respective radiation research programme has been a process of mutual dialogue and interaction. Within the United States, the DOE has carried the major responsibility for radiation protection research, and recent programmatic decisions suggest they may substantially reduce their support for physical dosimetry research. If so, the Commission research programme in this area assumes an even greater level of importance and significance. The Commission management is urged to maintain close interaction with their U.S. counterpart programme managers as the course of action at the DOE unfolds. Some modification in the scope and balance of the dosimetry research programme area may be warranted in the future.

An area of extremely high priority is the development of reliable biological dosimetry capability as a complement to physical dosimetry techniques. This would offer the promise of achieving a retrospective dosimetry capability that would be invaluable in reconstructing the radiation exposure history of accident victims and other exposed populations.

The programme addressing the transfer and behaviour of radionuclides in the environment develops the basic information required to describe the transport and dispersion of radioactive material through environmental media. Such information is required to achieve accurate, quantitative determinations of the movement of radionuclides from source to receptor and comprises an essential component of the predictive formalism needed to estimate population and sub-population exposures from radioactivity releases. Continued refinement and improvement in computational models describing atmospheric, terrestrial, and aquatic transport and transformation will reduce uncertainty in human population dose estimates and will establish a firmer scientific basis for communicating with the general population on radiation exposure issues.

Research in the environmental sciences has been one of the main priorities throughout the history of the Radiation Protection Research Programme. Over time this research has developed into a highly articulated part of the programme, well coordinated, and periodically

realigned in order to maintain a focus on the highest priority research needs. The new organization of the programme initiated in 1990, based on multi-national contracts under a coordinator has contributed toward a further balancing of the programme. Since 1990 the research activities have been directed more toward an integrated effort involving the study of the interactions between the ecosystem and the radioactive contaminants, as opposed to a programme involving measurements of contamination levels. This focus on the dynamic interaction between radiocontaminants and the environment recognizes that understanding and control of radioactivity in the environment requires an understanding of environmental processes as a whole.

Through this study area the research programme has addressed the fundamental processes and mechanisms that govern the interaction between radioactive contaminants and environmental media. The panel views this approach as highly appropriate in order to identify the basic principles underlying these processes and incorporating this information into appropriate radionuclide transport and transformation models. This approach has yielded progress in several areas including modelling the transport of radionuclides through the fresh water environment, radioecology of transuranics in the marine environment, and the bioavailability of long-lived radionuclides in relation to their physico-chemical form in soil systems. Also of note has been investigations into the rehabilitation of soil and surfaces following an accident. A major achievement has been the development of a decontamination method able to remove up to 99 percent of the radioactivity. This involves cultivation of rye grass on the contaminated soil. This shallow rooting grass readily absorbs radioactivity and can afterwards be removed.

Radioecology continues to be an important subject for future research, on the one hand to solve problems related to radioactive contamination of the environment and, on the other, to develop methodologies which can be used for the study of other pollutants. In the future, the objective remains the derivation of quantitative descriptions of the processes involved.

3.2 Consequences of Radiation Exposure to Man: their assessment, prevention and treatment

This study area has been sub-divided into three sections as follows:

1. Stochastic effects of radiation.
2. Non-stochastic effects of radiation.
3. Radiation effects on the developing organism.

Of these three sections, by far the largest amount of work lies in part 1, i.e. the stochastic effects of radiation. This reflects a number of factors, including the fact that the assumption is made that for radiological protection purposes there is no threshold of exposure to radiation below which ill-effects, particularly carcinogenesis and genetic effects can be ignored. This led to an emphasis on studies of low dose and low dose rate effects. Entirely apart from the scientific significance of this particular area of work, it is the area which vies with acute radiation effects for public concern.

The 1990-1991 and 1992-1993 research action in the stochastic effects of radiation remains essentially an elaboration of that developed during the 1985-1989 programme but has concentrated on:

- the further development of microdosimetry and biophysical modelling;
- the identification and cloning of human DNA repair genes;
- the study of the effects of clone and structure and DNA repair;
- the identification of the molecular lesions giving rise to chromosomal aberrations;
- the development of human epithelial cell lines for the study of transformation;
- the development of refined analytical techniques for use in animal carcinogenesis;
- the early chromosomal changes leading to leukaemia induction;
- induction of genetic effects in germ cells, including a consideration of genetic risk for disease with a partial genetic component.

The largest number of projects in this connection deals with cellular, molecular and animal studies to determine the mechanisms of stochastic somatic effects of radiation with respect to low dose, low dose rate, and radiation quality.

Good progress has been made over the whole area of research covering biological effects with outstanding results being achieved in some areas. The wider application of modern molecular biological techniques has opened new possibilities. This is especially relevant to the more detailed analysis of damage to DNA, its repair, even at DNA sequence level, and in the study of the early events in radiation induced cancer. This programme will doubtless develop further in the future.

New cytological techniques are being developed and perfected which together with new methods for detecting DNA damage will permit a better investigation of the way initial damage at the molecular level is converted to the cytological effects and eventually cancer. The problem of cell transformation systems has not been solved as the relevance of the fibroblast cell system to carcinogenesis is doubtful, and epithelial cell transformation systems have not yet supplied quantitative information.

Research using animals to investigate the induction of cancer by radiation have declined in number in recent years because they are expensive, and because they have a poor public perception. However, several critical questions remain unsolved and appear to be answerable from cell transformation techniques. The trend in animal experiments has shifted away from the large classical type of mega-mouse experiment to smaller more specific studies, and much use is being made of molecular biological methods to study early events in the carcinogeneses process.

The use of the CBA mouse to investigate radiation induced myeloid leukaemia produces an excellent example of how first class research can uncover important steps in the development of malignancy. This is also an example of an area in which outstanding progress has been made in the programme. It is also significant in that, while at first glance much of this work

appears to be of a fundamental nature, it has a very clear relevance to future application. In this area also come all the complex considerations that arise from the possibility of detecting individuals in a population with increased sensitivity. This issue raises all sorts of questions that go well beyond the scientific, but it seems likely that this may be the largest area for progress in this part of the programme in the near and middle future.

The analysis of experimental data on animal carcinogenesis is being refined to improve the use of modern mathematical methods and to standardize the types of analysis used. The newer techniques are looking for ways to combine the time dependence of occurrence of tumours in animals after exposure with the dependence of the tumour frequency on radiation dose to optimize the use of the information available. It is intended that these newer analytical methods will be used to reassess the results of previous animal experiments currently being brought together in the standardized database through the efforts of EULEP. This is of particular importance if the value of many years of work and large collections of data are not to be lost. A close interaction has been established with the database archive effort in the United States and continued coordination is strongly endorsed.

A number of projects address the question of the estimation of the genetic risks in man. However, this has to be studied primarily by looking at the increased mutation rate due to radiation exposure in experimental animals which produces all the problems associated with extrapolation between species and between doses and dose rates.

Attention is also paid to the metabolism and the effects of incorporated radionuclides. In this area come several multi-national projects looking at newly developed compounds for decorporation of internally deposited radionuclides.

There are areas of work covered in this preceding section where it could be argued that the studies have broader applicability than just in radiation protection. This is particularly true of some of the more fundamental work at the molecular level. Nevertheless, it is clear that molecular biology must be included in a comprehensive radiation protection research programme in order to bring the insights and technology of modern biology to bear on significant research problems in radiation protection. The point has been made that if this type of work is not included, the radiation protection programme will lose the involvement of keen young scientists in the rapidly developing molecular biology field. Furthermore, it is incumbent on the Radiation Protection Programme to bring molecular biology into the radiation protection research field; it is unlikely to occur from the other direction.

Non-stochastic effects of radiation are those for which the severity in an exposed individual and the frequency in an exposed population group vary with dose. In these cases a threshold dose may exist. Recently, these effects of radiation are called deterministic rather than non-stochastic, expressing that effects are causally determined by preceding events.

Persistent probabilities of exposure of people to high doses of radiation delivered either to the whole body or to a part of the body under accident conditions dictates a continued interest in and necessity for the study of the various aspects of non-stochastic effects in man. Moreover, knowledge of the pathophysiology, threshold doses for different tissues, dose-effect relationships in lethal and sublethal forms of their clinical manifestations, reliable

means and methods of diagnosis, and prognosis and therapy are still far from being well established. Experience after the Chernobyl accident demonstrated that fear from the severe early consequences of radiation might induce over-reaction on the part of the population even in slightly affected areas.

Of the 10 research actions initiated after the Chernobyl accident, one can be taken as directly related to non-stochastic effects: diagnosis and care of radiation accident victims. Development of a new practical approach for treatment of radiation accident victims has been the primary aim of the research action. This approach has made use of the hemopoietic growth factors which are becoming available due to modern biotechnological methods. Treatment with granulocyte/macrophage colony-stimulation factor (GM-CSF) and interleukin-3 (IL-3), that is known to stimulate bone marrow cells in vitro, might now be considered to be given soon after an exposure for all patients who are expected to develop pancytopenia. This will shorten the pancytopenic period and reduce the associated risk in patients who will eventually recover spontaneously. On the other hand, it now seems that only very few patients could benefit from the bone marrow transplantation under such circumstances, because in many accident cases some bone marrow is spared due to the inhomogeneous distribution of dose over the body.

A significant advance has been made recently towards the improvement of the diagnosis and treatment of radiation syndromes within the contract entitled "European Network of Experimental and Clinical Research of Radiation Accident Casualties". The network outlined in this contract will serve as a centre for the development of strategies to manage radiation accident victims and as a scientific basis for the training of medical doctors and nurses to handle patients with radiation injuries. A database called "Radiation Accident Case History", is being established that is suitable to record in a systematic way those early clinical signs and symptoms which could forecast later clinical developments and indicate if substitutional therapy of the patient is required and promising.

For decorporation of accidentally incorporated radioactive actinides, such as plutonium, americium and thorium, a siderophore analogue - 2, 4, 3 - LIHOPO - has been found in preliminary studies to be substantially more effective than the well known diethylene-triamine penteacetic acid (DTPA). Treatment with this decorporating agent may reduce the body burden of toxic radionuclides which should reduce the severity of non-stochastic damage as well as the risk of late radiation effects including cancer.

Contracts in the subject area "Radiation Syndromes and Their Treatment after Local Exposure to Skin and Subcutaneous Tissues", are addressing treatment modalities available for these tissues following accidental overexposures and the problems related to the improvement of radiation protection criteria for the skin.

A contract on "Irradiation and Thyroid Disease", aims to define the biological effects of radioiodine, the risk of low doses to the thyroid gland, and the potential risks of preventive administration of stable iodine. A part of this contract is concerned with critical examination of those assumptions which underlie the dose limits for thyroid irradiation, the intervention levels, and the recommended countermeasures.

The conclusions and recommendations of the previous Evaluation of the Radiation Protection Research Programme have obviously been taken into account by the management bodies of the programme in the preparation and initiation of the new radiation protection research actions in the field of the non-stochastic effects of ionizing radiation for the 1990 and forthcoming years. The high standard of research activities in these areas and the application oriented approach of the research teams involved have reached the point that several of the research results are already applicable and many others are promising to be applicable soon for practical purposes, such as the improvement of diagnostical means and methods as well as therapeutical modalities of non-stochastic radiation effects resulting from total body or partial body overexposure; effective removal from the human body of the most toxic radioactive substances, the actinides; and support of the radiation protection criteria for certain organs and tissues (skin and subcutaneous tissues, thyroid, lens of the eye) established for normal operational conditions and for accidental circumstances.

There are, however, some problems for which further cooperative efforts are certainly needed:

1. Establishment of precise indications and contraindications for bone marrow transplantation in acute radiation syndrome.

2. Elaboration of the most effective means and methods to accelerate restoration of the immune system.

3. Development of suitable biological indicators that are capable of verifying the occurrence of an overexposure to indicate its severity and to predict its possible prognosis quicker and with less working effort than chromosome aberration analysis.

4. Development of convenient methods to diagnose skin damage of such severity that early surgical intervention is the only reasonable choice that offers a definitive solution.

5. Investigations into some additional unresolved problems which have also been recommended by the previous Evaluation panel for further research including improvement of conventional symptomatic treatment of oropharyngeal and gastrointestinal syndromes; influence of age and intercurrent pathological factors on the clinical sequela of acute radiation exposure, such as burn, trauma, infection, etc.

The field on radiation effects on the developing organism remains a high priority subject, though the number of projects in this particular group is small. The aspects meriting most attention are radiation induced cancer and damage to the developing central nervous system. The deleterious effects of doses (10 - 1000 mGy) of ionizing radiation and the development of the central nervous system represent a much debated issue. There appear to be contrasting results from different sets of experiments, and some authors claim that doses as high as 500 mGy are largely innocuous to the developing organism while others describe apparently significant CNS effects at much lower doses.

Another contract addresses the subject of dysfunction ad neoplasia of hemopoietic and osteogenetic tissue following external radiation by bone seeking radionuclide contamination in utero or during neonatal development.

A third study addresses the dosimetry and effects of fetal irradiation from incorporated radionuclides.

In summary, in the field of the effects of radiation on man, good progress has been maintained over the whole area. The wider application of modern molecular biological techniques has opened new possibilities for more detailed analysis of damage to DNA and in the study of early events in radiation induced cancer. New cytological techniques have been developed and perfected which together with new methods of detecting DNA damage will permit a better investigation of the way initial damage at the molecular level is converted to cytological effects and eventually cancer.

Future research on the biological effects of radiation will concentrate on the extension of the use of the molecular biological models and on the integration of all available information coming from biophysical modelling, cellular data, molecular carcinogenesis, animal experiments, genetics, and epidemiology. A good understanding of all these approaches will be needed if a rational choice is to be made of the appropriate methods of extrapolating effects at high doses to define the risk of protracted low dose exposure.

There is perhaps a danger of emphasizing too much the exciting nature of developments at scientific frontiers and it is important to note that more pedestrian, but none the less important studies, such as the archive building by EULEP, also have their place and that whatever may be ascertained at the molecular and cellular level; in the end "the proper study of mankind is man".

3.3 Risks and Management of Radiation Exposure

The activities conducted within the subsector "Assessment of Human Exposure and Risks", include epidemiologic research on several exposed populations, radon studies, and comparative risk assessments. While studies of human populations are crucial, since this is obviously the only direct information on human risk, extrapolation from observed effects at high doses and dose rates to the low dose and low dose rate area of worker or general population exposure introduces uncertainties. Yet it is in these latter areas that improved understanding and firmer estimates are needed to undergird regulatory actions and to allay unwarranted public concern. Recent efforts to accomplish a pooling of data from several studies is an important step in improving the statistical power of the research.

The advances achieved in molecular biology will also play a significant role in the further development of radiation risk methodology. The issue of individual sensitivity and variation in sensitivity throughout a population may become a matter of importance. Molecular epidemiology, indeed, may offer new approaches toward the evaluation of population and individual risk from radiation exposure.

Radon research continues to merit high priority in view of its significance as a source of natural radiation exposure. Current efforts are investigating improved methods for measurement of radon daughter particle size distributions, enhanced calibration techniques, clustering and attachment processes, development of advanced field sampling technology, and surveys of radon concentrations in homes. Recent results indicate that measurements of these parameters in the domestic indoor environment are markedly different from those measured outdoors and especially from those measured in the mining environment. This research has resulted in the definition of a conversion factor of 50μSv annual effective dose equivalent for 1 Bq/m^3 radon concentration.

Since 1990, the focus for the research on comparative risk assessment had been on the development of a sound conceptual framework and methodology to assess the environmental impacts of different energy generation technologies, in particular, coal and nuclear. This methodological framework will enable improved comparisons between the environmental impacts. However, much remains to be done to ensure that the estimation of environmental and health impacts of conventional pollutants is made on a comparable basis to that for radioactive pollutants where the techniques and data available are more advanced. Improvements in the modelling of conventional pollutants are important in order to assist in sounder and more optimal allocation of resources to achieve environmental and health improvements. This is an important area of study, particularly since there is such great public misunderstanding of the significance of the risk from various sources including alternative energy technologies. As in many other areas, a major challenge will be to achieve an effective means of communicating scientific determinations with the general public.

The research effort within the subsector, "Optimization and Management of Radiation Protection", includes activities in the areas of optimization of protection (ALARA), reduction of patient exposure in medical diagnostic radiology, and probabilistic risk assessment.

Research continues to focus on the practical implementation of the ALARA requirement. The conceptual basis and practical implementation of ALARA in normal operations are relatively mature and emphasis has shifted from development of techniques to their application in new areas and to training. In particular, efforts are being addressed to the establishment of intervention levels following a nuclear accident.

The research effort that is focused on the reduction of patient exposure in medical diagnostic radiology is addressing primarily exposure from x-ray examinations, but also includes investigations into patient dose from the use of radiopharmaceuticals in several nuclear medicine procedures. The tasks of this research programme include the following basic principles:

- to put emphasis on research which produces the prerequisites for optimum diagnostic efficacy at reasonable doses to the patient and staff and at reasonable costs;

- contribution to the implementation of the EC Directive laying down basic measures for the radiation protection of persons undergoing diagnostic examination or treatment;

- evaluation of data and supporting a more global use of the research results in daily routine work of radiological departments;

- coordination of research work.

The research priorities within the programme are given as:

- establishment of quality criteria for special examinations and techniques;

- impact of quality criteria on patient exposure;

- dose assessment for special irradiation conditions;

- evaluation of dose reduction measures; and

- evaluation of data for the quantification of individual risk.

Improved Monte Carlo techniques and new types of mathematical phantoms (VOXEL phantoms) have been developed for calculating organ doses from conventional radiographic and computed tomography procedures. These techniques are valuable, for example, in assessing the impact of different radiographic techniques and patient parameters on organ dose, which should contribute to a benefit/risk analysis for the patient's clinical management.

The list of quality criteria for diagnostic radiographic images has been checked for their more general applicability in the 1991 trial with three examinations: chest, lumbar spine and breast. The doses were measured for more than 2,000 radiographs from a large number of radiological departments from all over Europe, and the image quality was evaluated by independent radiologists. The results of this study will demonstrate whether the conclusion of a similar trial in paediatrics can be confirmed: that radiographs which fulfil most of the listed criteria result in the lowest dose. These quality criteria can contribute to overall good practice in diagnostic radiology and should be incorporated into training programmes.

Optimization of radiation protection in defining objective quality criteria linked to the potential reduction of patient exposure in medicine, and specifically in diagnostic radiology, is an effort that the Radiation Protection Programme has started successfully. However, many areas such as paediatric radiology, computed tomography, new digital radiographic techniques and nuclear medicine still need attention. These efforts are particularly urgent in view of the rapidly expanding application of these procedures, the still largely unexplored relationship between diagnostic information content and the potential in dose savings, as well as the prospects of economic savings and better health care that will be a consequence of clinically relevant, optimized radiation protection measures.

A new probabilistic accident consequence code, COSYMA, has been developed and distributed to institutes in the EC and elsewhere. Current efforts are to facilitate use of the code by a large number of users and to quantify the uncertainties of its predictions. A personal computer version is being developed to further increase its availability and use.

Important collaborations are underway with the U.S. Nuclear Regulatory Commission and with the IAEA to assess modelling uncertainties.

Enhanced computational power, better meteorological forecasting capabilities, and improved environmental monitoring of radioactive material have all contributed to significant improvements in the ability to assess the radiological consequences of accidental releases of radioactivity. Current emphasis is on development of a system to support decision makers on how best to mitigate the consequences of a nuclear accident.

CHAPTER 4

AGREEMENT FOR INTERNATIONAL COLLABORATION ON THE CONSEQUENCES OF THE CHERNOBYL ACCIDENT

A very important development in 1991 and 1992 was the implementation of the agreement for international collaboration on the consequences of the Chernobyl accident. The background to that agreement is significant. After the accident in April 1986, for many months there was unprecedented technical and scientific work in the former USSR to evaluate the amount and composition of the radioactive materials released and to assess and mitigate the consequences. One of the major consequences was the contamination by radionuclides of large areas of three republics of the former USSR, namely Belarus, Russia and Ukraine. Different action levels of contamination were set in different areas and the results of all this activity was a great deal of public confusion and apprehension, and consequently, a great deal of mistrust of scientists and policy makers.

The degree of disruption to the lives of many thousands of people would be hard to exaggerate. It is not only the physical consequences such as relocation or attempts at decontamination or restriction of use of foods, but the psychological consequences which have been shown to be extremely damaging. A large study carried out by the International Atomic Energy Agency suggested that perhaps there had been some over-reaction to the radiological consequences, but that certainly there had been fundamental and far-reaching psychological consequences.

It is not possible to consider these social and scientific aspects in isolation. At the same time as these traumatic events were going on, the former USSR was breaking up and the main contaminated areas were to be found in three republics, Belarus, Russia and the Ukraine. Chernobyl itself is in the Ukraine and that was the obvious starting point for studies. The events after the Chernobyl disaster were themselves important but they also acted as a focus for the criticism of the former centralised USSR. The issues of political, scientific and health aspects became intermingled.

There are other important aspects to be considered. The population in the affected areas has seen a stream of scientists, social workers and others coming and looking at their predicament and making comments upon it. They have endured great hardship and have felt themselves in great peril. It is not unnatural that they should ask of any other people who come to study the situation some quite searching questions as to who will benefit from work being done and what the end product is. Allied to this there have been many bilateral aid activities set up with one or another of the republics by individual western countries or charitable associations. All this means that any activity in this area, scientific and geographical has to be presented with great tact and understanding. The need to benefit all mankind with improved knowledge has to be seen as a genuine partnership between scientists from different countries, and this sort of research activity must not carry a taint of condescension or charity.

Considerable resources are being spent by the three republics on moderating the consequences of the long-term contamination of the territories. However, these levels of funding are unlikely to be sustainable in either the medium or longer term because of all the other economic, social and environmental problems in the same regions. It could indeed be argued that a disproportion in allocation of resources to the problems of radioactive contamination could be damaging to the development of proper priorities for action across a much wider field.

There are two ways in which allocated resources have to be measured. First there are for reasons not at all connected, or very little connected with Chernobyl, large medical and social problems to be dealt with. Second, even from the point of view of radiological protection research, it is important that a major and very visible incident such as Chernobyl should not distort research thinking and planning. It may well be that in radiological protection generally, there has been too much interest, or at any rate, disproportionate interest, in the problems associated with major power plants and installations and not enough in the areas of other sources of exposure and contamination which have led to just as serious and frequent complications, such as loss of or damage to radioactive sources.

Given the very substantial human and monetary resources that have been, and continue to be, spent by the three republics on the alleviation of the consequences of the Chernobyl accident, it is evident that any contribution made by the EC can only be modest by comparison. However, with proper targeting such support could have an influence and benefit far beyond that measured in purely monetary terms. The scope and content of the EC/CIS programme on the consequence of the Chernobyl accident have had this aspect as a prime objective. The original intention was to operate within the CHECIR (Chernobyl Centre for International Research) which was established by an agreement between the former USSR and the International Atomic Energy Agency in 1990. Because of the political changes, this had to be modified and eventually an agreement was signed in June 1992 between the Commission and the three new republics of Belarus, Russia and Ukraine to establish the joint programme of work. There are many aspects to this joint programme, but perhaps one of the most important is the forging of direct links between scientists in the CIS and the EU countries and development of trust, not only between such scientists but between the population in the affected areas and all scientists concerned because there had been some breakdown in belief in the integrity of the scientific information that was being distributed to the population. Whether that breakdown was justifiable or not is not important but, if rational decisions are to be taken over a period of time, such a breakdown cannot be tolerated. Nor is the agreement entirely one way. Fortunately, there have been few widespread and serious events like the Chernobyl accident and therefore experience of consequences and of necessary follow-up actions, both environmental and medical, is limited. It may sound cold-blooded to say that it is absolutely vital that all the knowledge that can be gained from this tragedy should be pursued for the future benefit of society as a whole.

The first series of EC/CIS coordinated research was of 7 scientific projects, 5 of an experimental nature and 2 of strategic character. The basic aim of these projects is to give answers to 3 major questions raised by pollution of the environment as a result of a nuclear accident, i.e.:

- the extent of transfer of radionuclides through the atmosphere, the terrestrial, the aquatic and the natural eco-systems;
- the strategies and decision criteria for counter-measures;
- the assessment of the consequences to man.

Their aim is also to lay the foundations of a closer collaboration between CIS and EU countries in the field of the protection of man and the environment against radioactive pollution.

On the EC side, these shared cost projects are funded by means of APAS[1] (activities funded outside the third Community Framework Programme for Research and Technological Development) which are annually allocated to conduct priority actions (Figure 4). The activities are overseen by a coordination board which is made up of three EC-representatives, three representatives, one from each of the relevant republics, and three observers, one from each of the relevant republics. For various reasons, mainly of a logistical nature, the starting of the work was somewhat delayed, but during the first year of the agreement the intention was to proceed with the following projects.

TABLE 4

List of ECP's [2] and JSP's [3] Launched in 1991

Joint action	TITLE
ECP1	Contamination of surface by resuspended activity
ECP2	Transfer of radionuclides through the terrestrial environment to agricultural products and livestock, including the evaluation of agrochemical practices
ECP3	Modelling and study of the mechanisms of the transfer of radioactive material from terrestrial eco-systems to and in water bodies around Chernobyl
ECP4	Decontamination strategies
ECP5	Behaviour of radionuclides in natural and semi-natural environments
JSP1	Development of computerized systems for predicting the radiological impact of accidents to aid off-site emergency management
JSP2	Conceptual basis for establishing levels and strategy of intervention in the case of a nuclear accident

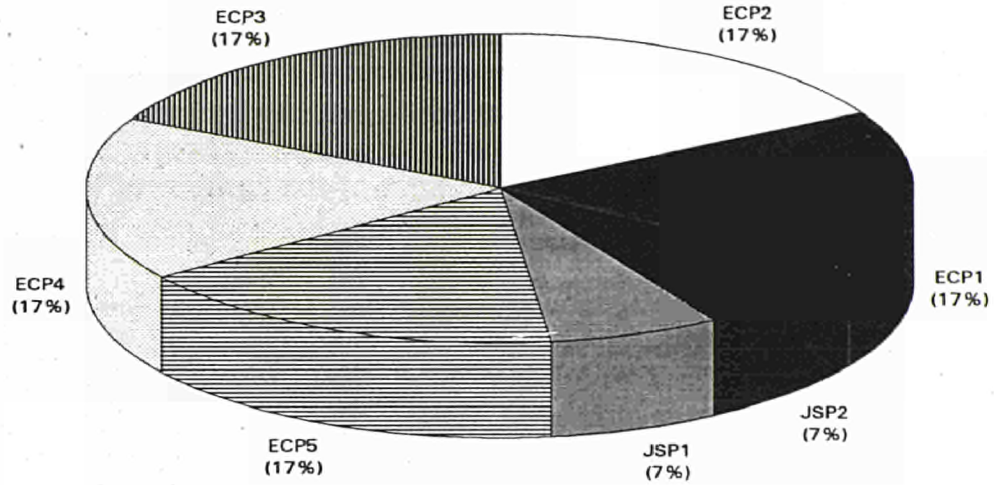
[1] APAS: Preparatory, Accompanying and Support Activities.

[2] ECP: Experimental Collaboration Projects.

[3] JSP: Joint Study Projects.

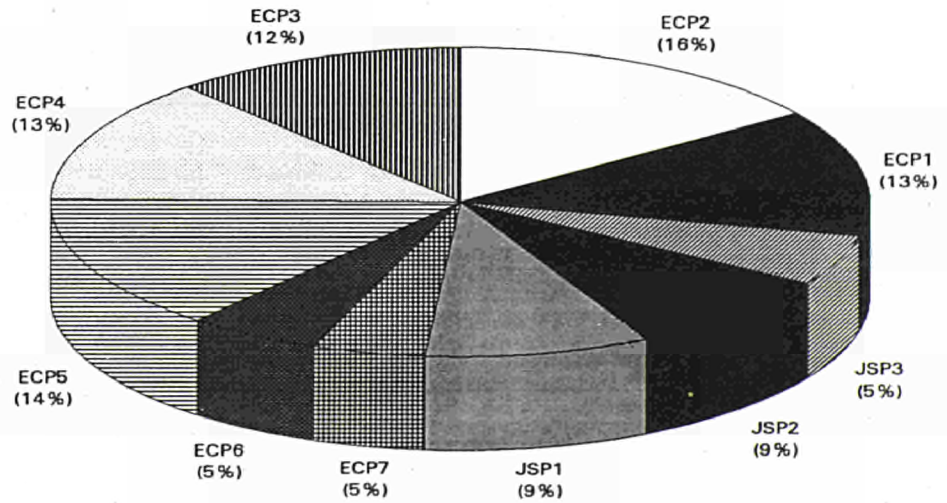
Figure 4 : APAS Actions

(Reprinted from the programme staff presentation to the Panel.)



1991

ECP1	363	KECU
ECP2	358	KECU
ECP3	363	KECU
ECP4	363	KECU
ECP5	363	KECU
JSP1	137.2	KECU
JSP2	152.7	KECU



1992

ECP1	560.5	KECU
ECP2	665.5	KECU
ECP3	495.5	KECU
ECP4	560.5	KECU
ECP5	600.5	KECU
ECP6	223	KECU
ECP7	200	KECU
JSP1	375.5	KECU
JSP2	370.5	KECU
JSP3	227.0	KECU

Subsequently, three further health related projects have been added, and six more planned (Table 5).

TABLE 5

New collaboration (health-related) projects to be included in the 1992/1993 programme

Action type	Title of the project
ECP6	Biological dosimetry including cytogenetics
ECP7	Epidemiology
JSP3	Patient treatment
Future developments planned	
ECP8	Molecular epidemiology of childhood thyroid cancer
ECP9	Contamination of animal products of animal bred in extensive agricultural systems and of free-ranging animals
ECP10	Retrospective dosimetry and dose reconstruction
JSP4	Development of optimal treatment and preventive measures for childhood thyroid cancer
JSP5	Risk pathway analysis
JSCP6	Contamination pattern maps

It has become clear in the course of these developments that there are other areas of significant contamination elsewhere in the former USSR. The principle of establishing central laboratories accessible to both EU/CIS scientists in each of the three CIS republics has been agreed, and therefore the Chernobyl laboratory, which will become part and parcel of such a laboratory network in the CIS, is being renamed the Chernobyl Central Laboratory as part of the future Ukrainian Regional Laboratory.

Behind these briefly recorded paragraphs there lies an enormous amount of activity: scientific, administrative, budgetary and organizational. To run successfully, the collaboration programme means intensive interactions between EU (plus EFTA) and CIS laboratories or institutes working in the same area (more than 50 in total) with a straightforward distribution of responsibilities between the different partners. Although not perfect, the situation nevertheless is proving to be workable. There are many meetings and much travelling and there is a large scope for muddle and misunderstanding, but, the will to succeed being there, as it undoubtedly is, means that one should look beyond the apparent frustrations and complexities of organizing such a multi-national activity and seek to evaluate it basically in

a scientific frame. Within the framework of the collaboration agreement and the consequences of the Chernobyl accident five main issues had to be faced:

- The establishment of collaboration between the EU (and others) and CIS scientists.

- The role of the programme to complement and assist those in the three republics responsible for evaluating and mitigating the consequences of the accident.

- New information of general interest for the EU countries in the field of the management of a nuclear accident.

- The prospect for possible future developments.

- The practical implementation of the programme.

In practice, the implementation of the programme demonstrated that irrespective of the different backgrounds and experience, fruitful collaboration between EU and CIS scientists can be established. In no case did cultural or language differences represent unsurmountable barriers for the exchange of information, discussion of scientific achievements and local support. Actually, the primary problem encountered was the slow circulation of information through the complex administrative system set up in the CIS in which the national coordinators play an important part.

As a reliable understanding of the behaviour of radioactive contamination in the environment and its transfer to man constitute the central issue to any evaluation of the consequences of a nuclear accident, it is obvious that priority was given to this aspect within the first year of the programme. Later on, evaluation and mitigation measures and off-site emergency management will almost certainly figure more largely.

One of the outstanding features of the programme so far has been the value of the exchange of scientists between EU and CIS laboratories in order to exchange information, gain practical experience and train in using highly sophisticated technologies and, as necessary, to involve the scientists from one side to the work performed in the laboratory from the other side. So far, emphasis has been put on the practical problems arising from the Chernobyl accident. If that were the whole story it could be suggested that, while this may be valuable assistance, it has little gain as far as the EU partners are concerned. This would appear to be far from the truth. Very few cases of important radioactive pollution of the environment have occurred so far on the territories of the European Community. Therefore, the widespread and persistent contamination of the environment around Chernobyl represents a unique field of study for the EU Member States as already mentioned and will enable them to improve the knowledge of the consequences of such an accident, and, more particularly, to test techniques (e.g. in the field of decontamination) in real conditions, to validate models of transfer of radioactivity in the biosphere and to assess the health consequences to man. Of particular interest is the analysis and validation of data previously accumulated by the CIS scientists.

However, possible benefits go even wider than that. There is little doubt that much could be learned from these particular contaminated areas and over-exposed persons, but also from previous over-exposures in other parts of the former USSR. Epidemiological and clinical studies and close examination, particularly of clinical records of therapy of previously over-exposed persons may well have much to teach us in the west and it is absolutely vital that this unique collection of experience and data should be tidied up and codified before memory fades and records are lost.

We were made aware of the great value which the scientists from the CIS countries thought should be the consequence of the new openness of disclosure of all sorts of previous events and of the value of an equal partnership in studying what lessons can be learned from these data.

The establishment of this collaborative programme between EU (plus EFTA) and CIS laboratories or institutes, employs intensive interaction between all partners within the framework of any particular project. Over 50 EC-partners were participating and their respective responsibilities and work programmes have been successfully defined. The most urgent need is the practical one of improving communication links as the poor telephone and fax lines are causing delays in all fields. Some equipment has already been supplied but more may yet have to be provided. Other aspects causing serious complications are the complex financial procedures and difficult administrative problems. This is particularly true for obtaining customs clearance for shipped equipment and for export of samples and transferring hard currency. The local authorities have been contacted to try and find simpler and more efficient procedures. However, taking into account the problems encountered, it may be concluded that the first years have been successful and this can be attributed to the enthusiasm of all teams involved and especially to the enormous commitment of the coordinators.

From the EC co-ordinators and from the selection of coordinators we met from the CIS, we heard much of the enthusiasm which has been put into the work and the high hopes that exist for successful operation and conclusion. In all the circumstances, while clearly our evaluation of the EC/CIS co-operation has been incomplete, we have firmly formed a view that whatever the difficulties, there is much important work to be done and the approach developed appears to us to be a right and proper one. Problems of funding, both for this area of the programme and for its effect on the overall funding available for the Radiation Protection Programme are obviously considerable, but we are of the view that this work is of high priority if it can continue to be done in a cost-effective way. Because the start was delayed, it is not yet possible to do a serious evaluation of the results, but our view is that the early signs are favourable and perhaps the Commission should consider a more detailed review of this part of the programme in a year or two.

This positive conclusion that we have drawn should not obscure a few problems of which we were made clearly aware. Some of these have already been referred to and they are of a basically bureaucratic and administrative nature to do with currency controls, customs and so on. Others, on the other hand, may lie deeper and may cause future problems if they are not openly recognized now. Our colleagues from the CIS made their anxiety about the possibility of a brain drain very clear. This phenomenon might arise from several sources.

For example, there is the question of scientists simply leaving the country for better paid employment elsewhere.

There is also, however, an additional factor and that is tied up to the levels of remuneration in science generally in the CIS. As we understand it, it is possible for very well equipped mature scientific scholars to seek other employment in industry or commerce which is far more remunerative. In the long term this could prove a much greater barrier to advances in radiological protection that other difficulties in the research field. This is a matter we feel outside our remit, but we thought for completeness, it had to be mentioned. There are also practical problems at the frontier between research and implementation. There is not much point studying complicated communication systems unless there is a fair understanding that there is going to be a unified emergency system put in place using the results of the research. Some scientists put to us the need for what could be called coordinating the coordinators. Steps have already been taken in this direction as we understand it, and it is important that the various projects are kept in full touch with each other so that the fullest advance can be made on all fronts. Perhaps over and above all that we have found in these discussions, as in so many of our others, a major area of concern is public attitude and public response. There is little doubt that there has been a loss of confidence in many countries in science and scientists. No matter how good the research is, no matter how careful the scientific work, it will be of little avail unless it wins trust from those on whose behalf it has been conducted.

CHAPTER 5

TRAINING

In a recent publication of the EC (EC Research Funding - 3rd Framework Programme - A Guide for Applicants; 3rd fully revised edition, September 1992), among the supporting measures for research and technological development, the role of education and training is emphasized as follows: "Integration of science and technology into Community policies is important for the success of the Single Internal Market in Europe. The Framework Programme for Research and Technological Development is therefore backed up by Europe oriented education and training programmes, and by support for technology transfer activities. Europe's businesses and universities need qualified specialists, who are familiar with the conditions and opportunities across national borders, and who are capable of working and willing to work on an international level. For this reason, the Community supports education and training, ...".

1. Training in Radiation Protection prior to 1990

Maintenance and development of radiation protection expertise have always been an important aim of the Radiation Protection Research and Training Programme. This training has been carried out by several means, in particular by organized training courses, grants for post-graduate training and different coordinating activities of the Programme, such as study group meetings, seminars, cooperative groups, etc. Since some of the training activities were taken up by other Community Programmes, such as ERASMUS, and by the cooperative groups of the Radiation Protection Research Programme EULEP, EURADOS and IUR, the Radiation Protection Research and Training Programme could then concentrate on specific aspects of training in radiation protection, in contrast to the early training programme where subjects such as molecular biology and genetics, applications of radiation and radionuclides in medicine and agriculture, etc were included.

Until 1985 only a few specific training courses were organized, since a sufficient number of scientists were working at universities and national institutes. More recently, however, the impending retirement of many senior staff, and the discontinuation of many university chairs and departments dealing with radiation protection and radiation biology, make it necessary to restore and re-emphasize training in radiation protection both at undergraduate and post-graduate levels.

The utmost urgency to give an appropriate response to this development has been stressed by the previous Evaluation Panel in the Conclusions of its Report: "It is evident that training in areas of radiation protection research has now become a critical need". This is repeated in the Executive Summary of the same Report: "It has been obvious for some time that a shortage of expertise in radiation protection research may develop in the European Union. A significant cohort of experienced scientists is now reaching retirement age and inadequate measures have been taken over the years for their replacement. It is now essential to fund training programmes

that will assure the continuity of existing knowledge in radiation protection and to provide the background necessary to solve outstanding problems in this area".

Furthermore, it has been recommended that training programmes should be funded that will ensure:

- continuity of existing knowledge which has been carefully built up over a period of years by a selected but still relatively small community of scientists;

- the background to pursue research avenues that will advance knowledge in the last decade of the century and into the next century; and

- the availability of up-to-date knowledge and well trained scientific and medical specialists for advice in the case of accidents such as that at Chernobyl.

"The time for conducting this effort has almost expired, past pleas about training have not been answered, new pleas must be couched in terms of utmost urgency before it is too late. There is an absolute need to preserve and build on what we know now. It is a paramount responsibility for our generation of scientists to make this need known and for administrators and politicians to ensure that it is carried out. Funds must be provided in 1990-94 and beyond for effective training at all levels for operational and research purposes".

That Panel has also recommended that a Commission study group or committee be set up to consider and develop new approaches to training.

Current Education and Training Activities in Radiation Protection

The Radiation Protection Research and Training Action 1990-1994 has responded to the recommendations of the previous Evaluation Panel. The Council decisions for the 1990-91 and 1992-93 periods have also specified the necessity to encourage training of research workers and engineers and that advanced training is essential for radiation protection. Education and training activities are now grouped under the acronym ERPET (European Radiation Protection Education and Training) and involve: organization of training courses, development and provision of information and training packages, exchange of scientists and promotion of participation in scientific conferences.

Training in the 1990-91 Action was enlarged and extended to several levels of knowledge and adapted to various target groups such as:

- undergraduate students in medicine and the sciences by providing correct and up-to-date teaching material to university professors who are often only marginally interested in radiation protection;

- young scientists helping them to carry out their research in an optimal way, to be integrated into cooperative activity with other institutes and to devote their efforts constructively to the problems of radiation protection;

- different professionals assisting them to apply the specific radiation protection principles optimally in different areas, e.g. to optimise radiological image quality and patient exposure, to utilize the emergency management systems developed in the Programme, to treat radiation accident victims, to reclaim contaminated land, etc.;

- persons responsible for the general management of radiation protection and for the teaching of its principles.

These training activities are organized by the EC staff in charge of radiation protection research, in cooperation with the services of DGXI, Regulatory Aspects of Radiation Protection, and, where appropriate, with the Joint Research Centre in Ispra, together with existing EC contractors or supported cooperative groups.

The selection, organisation and evaluation of these activities are reviewed by the Training Committee, whose members are the former and present chairmen of the CGC, EC staff members and, if appropriate, invited experts.

According to a guidance issued on the organization of ERPET courses following the evaluation of courses organized in 1990-91, proposed ERPET activities should fit one of the 5 groups defined as follows:

A. Establishment of training packages, preparation and organization of training courses, to be made available for regions and on subject areas where knowledge and practical know-how need to be increased (for not more than 75 participants).

B. Updated standard courses in Member States which present the state-of-art in specific subject areas (for 20-30 participants).

C. Individual courses at institutions which present some specific know-how (for about 20 participants).

D. Special courses on recent concepts, methods and research results for interested scientists (for 10-15 participants).

E. Establishment of training material for students in medicine and the sciences (manuals, audio-visual material).

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3. Major Achievements in Training

During the 1990-92 period, some 20 training courses, attended by about 600 participants were organized. These training courses covered wide ranging subject areas: optimization of radiation protection of the workers, the public and the patient; radiation physics; radio-ecology; management of nuclear emergencies; the use of the probabilistic accident consequences code COSYMA; modern techniques in radiation cytology and DNA repair, etc. In the same period, 48 scientists were supported to allow their attendance at training courses and scientific meetings, 9 post-graduates were awarded grants for specific scientific projects.

Based on an enquiry conducted in EU Member States concerning training and certification in radiation biology related to radiation protection, a European training course in Radiation Biology has been proposed for 1994. It will be organized by the Medical College of St. Bartholomew's Hospital, London. The ERPET action will sponsor 3 or 4 young scientists and 7-8 eminent lecturers from the Member States. The course leads to an MSc degree.

4. Management and Administrative Aspects

If, as we believe to be the case, further emphasis and development in the training field is probably the most important aspect to be considered at this time, then certain other aspects have to be considered. It can be argued that there is a training element in some of the multi-national projects and we discuss parts of this in Chapters 4 and 6. However, the likelihood that the overall amount of funding available for research is not going to increase very substantially means that that money should not be diverted to what is primarily a training function but should be exploited for its true purpose, i.e. research. We would suggest that the possibility of separate "ring fenced' funding for the training prospectus should be studied in conjunction with other relevant EC services.

Our attention has been drawn to certain practical points which are outside our terms of reference. These include, most notably, the fact that in some countries for post-doctoral training, short-term fellowships of appointments of a few years are not very practical since problems of security of tenure of posts arise. However this matter is to be dealt with, there is no doubt that such post-graduate and post-doctoral training activities are extremely important and to be encouraged.

5. Conclusions and Recommendations

1. Efforts to increase the role of education and training within the Radiation Protection Programme should be maintained in order to ensure continuity and advancement of knowledge in radiation protection, to diminish the currently existing imbalance in the level of expertise between the different Member States, and to make as many specialists capable to work on an international level as necessary.

2. Education and training courses of the EC should be harmonized with similar activities of other international organizations and scientific bodies (e.g. IAEA, ILO, WHO, IRPA) in respect of both the teaching materials and the target groups.

3. The types of ERPET activities should be defined more clearly and be more comprehensible to the outsiders (e.g. establishment of training packages vs. establishment of training materials) and perhaps their varieties should also be reduced after a careful revision. Type C activity cannot be found and Type E activity can only be found very rarely among training proposals.

4. The possibility of issuing a certificate on successful participation in an organized training course which would have an European-wide recognition seems to be a pressing need at the present time.

5. Regarding practical aspects of radiation protection, more emphasis should be given to training courses organized for senior scientists (teaching of teachers) and letting the national organizations convey the knowledge obtained to the individual users or to the radiation protection practitioners.

CHAPTER 6

MANAGEMENT AND PROCEDURES

1. Role of Commission Staff

It is obvious that there is a highly motivated staff who bring to their many tasks a wide range of professional and technical expertise and who, as we found from our discussions, have earned and retained the confidence and respect of the many scientists throughout the countries with whom they have to deal.

It is clear that the workload is very heavy, perhaps excessive, and changes in policy such as the emphasis on multi-national contracts has not significantly changed the position. The use of association agreements does enable a wider range of scientific expertise and opinion to be applied to the selection and supervision of programmes, but, since these agreements have to be organized and coordinated, such a mechanism, while it increases the depth of scientific coordination and assessment of work, does not significantly reduce the staff workload. The position is further complicated by the large amount of travel involved for the relatively small number of senior people who are based in Brussels to undertake these tasks. Since it is probably unrealistic to talk of substantial staff increases or more significant parts to be played by seconded staff, this aspect has to be reflected in our views of the extent and direction of the programme.

2. CGC (Management and Coordination Advisory Committee)

The CGC is an Advisory Committee composed of government representatives (two per country) who may themselves be experts or be supported by experts as the need arises. The CGC assist the Programme Managers in their tasks, including the evaluation of proposals submitted, the future orientation of the programme, the programme's efforts to achieve greater European cooperation in the field of Radiation Protection research, and cooperation with non-European countries. Apart from the 12 Member States, Sweden has become an associated Member since 1991. Two Swedish representatives (and occasionally additional experts) attend the CGC meetings.

The CGC contributes towards the evaluation of the proposals. Prior to the CGC meeting, each CGC member receives the relevant documents and eventually submits, after consultation with national experts, an opinion to the Commission. Each proposal is ranked according to four categories: High (H) or Low (L) priority, with (Y) or without (N) need for discussion.

Using a weighting formula, an overall score is computed and used as a guidance for further discussions. Proposals are then discussed in the three CGC working groups and members are asked to give particular attention to the following criteria:

- expertise should be maintained over the entire range of subjects, implying an equilibrium between the subject areas;

- funds should be spread reasonably between research institutions, national laboratories, universities and possibly, the private sector;

- a balance between Member States should be reached allowing fair development and maintenance of knowledge and expertise in all Member States;

- the project should have a European dimension and not just be of national interest.

Proposals are then ranked in four categories: high priority (H), medium-plus priority (M+), medium (M) and low priority (L). High priority projects are proposed for immediate support. Medium-plus proposals are proposed for a waiting list (pending evaluation of newly submitted proposals and availability of resources). Medium priority proposals are scientifically sound but duplicate other proposals proposed for support or do not address a programme priority. Low priority proposals are thought to be irrelevant or of poor quality.

During the working group meeting, if an expert has a direct or indirect interest in one of the proposals, he/she will not be present during the discussion of that proposal.

A rapporteur, designated by the working group, reports the opinion of the working group to the plenary meeting. The Commission's services take note of the opinion given by the working group, which is eventually modified following a specific discussion in the plenary session. The final decision of support is then taken, based on the Commission proposal indicating final priorities and proposed amounts of support. The CGC gives a formal opinion on this proposal.

The CGC also plays a major role in planning. It discusses the orientation of one Programme, the Commission's proposals for a new Programme and the future strategy.

The CGC is a central part of the whole process and it is clear that its members and their colleagues in the Member States whom they consult, give generously of their time and knowledge.

There are intrinsic difficulties in getting the balance of a body such as this right. Clearly, the most important thing is to get the science right and for that reason the body must have in its membership appropriately qualified high quality scientists. At the same time, since recommendations taken by such a group have policy implications, it is important that knowledgeable government representatives should also be among their number. This is not a new problem and, if one dare talk of sides in such an issue, there is an intrinsic danger of suspicion between the policy makers and the scientists as to who is going to have the dominant voice. There is no simple

answer to this question and, as in so many fields, it becomes a question of the interplay of personalities, gifts and abilities. Such a balance is delicate and we felt it right to reflect the concerns of some with whom we have discussed this question about the need for continual vigilance to maintain a satisfactory equilibrium.

With such a wide remit, scientifically and geographically, it is inevitable that much of the preparation for evaluation of merit is taken outside of the actual meetings of the Committee. It follows from this that the more senior and experienced Committee Members, particularly from countries with the most extensive radiological protection programmes, are bound to exert a strong influence. At times it may look as if a considerable amount of the actual Committee work is, if not predetermined, bound to be heavily influenced by the close links between some members and the Commission staff. This is probably inevitable and no suggestion is made that bias exists or that unfairness in allocation occurs. We have heard comments that some smaller research organizations feel that their chances of success are slight unless they are assisted or sponsored by those who are already deeply involved in the programme.

The Commission is clearly aware of this problem and has published a very helpful guide to EC research funding which has been widely distributed. It has also been made clear to us that senior officials in Brussels have been extremely helpful in advising individual researchers and research groups as to how to structure their proposals and as to how the mechanism operates. While the policy is quite clear about these larger groups and many of the advantages of such a policy have been demonstrated to us, we still have some slight reservation that there are very individualistic scientists who may have bright ideas which are lateral to the general drift of the programme and which could not easily be incorporated in larger groups but who should be able to find encouragement and support from such a major patron of research. It would be a pity if rigidity of policy were to exclude occasional exceptions for such examples. The history of successful research contains many individualistic examples and not every scientist, or indeed every individual in any walk of life, finds it easy to conform to any one particular norm of a system.

However, this discussion brings up again the whole question of the scale of effort available to carry out so many activities over such a wide spectrum.

The only criticism of the meetings of the CGC itself that is apparent is that members tend to concentrate on certain "popular" aspects of the programme and perhaps to give less attention to some research areas. It should be possible to organize the meetings in a way that distributes the attention to the various aspects more evenly.

3. Coordination and Cooperation

There are two aspects to be considered under this heading.

3.1 Coordination with EU and with Associated Countries

Much of this has been discussed above but it is relevant to note that countries outside the EU which participate in the programme have been recognized by the appointment of two Swedish scientists to the CGC and by the attendance there of scientists from Austria, Norway and Switzerland. Special mechanisms have also been introduced for the coordination of the post-Chernobyl programme which is discussed elsewhere.

The roles of EULEP, EURADOS and IUR are also important. The Commission supports these organizations which play a very vital part in the formation of links between scientists and laboratories in different countries. They provide a well-established and economical forum for the interchange of views of working scientists, including these at a more junior level. The importance of all these activities for training, both for younger scientists and for scientists and countries which do not have such an extensive radiological protection programme can scarcely be over-estimated. However, as discussed in Chapter 5, when funds are tightly constrained, considerations of training must not impede maximum concentration on essential research.

3.2 International Coordination

Close links have been forged, particularly with North America (and to a lesser extent Japan) and, in addition to observer status at official planning committees and so on, there is a very full participation by Commission staff and contractors in the extensive scientific meetings of one kind and another throughout the world. This is all much strengthened by the unofficial and personal links which have been forged by specialists in this as in other fields. Those activities contribute a lot to the dissemination of knowledge as well as helping to minimize the extent of overlap which will always occur to some extent and is not always detrimental.

It would be incomplete to talk about coordination of international research without referring to the coordinated work with the CIS. This is separately addressed in Chapter 4.

The international relevance of the programme is not confined to research. There are important links to standard setting and to the general subject of the understanding of the biological and environmental effects of radiation. Among the many bodies with which the EC programme and its staff interact, are ICRP, ICRU, UNSCEAR, OECD-NEA and IAEA.

4. EC Multi-National Projects

A major development in the field of policy-making has been the emphasis on multi-national contracts and this raises many important points which emerge in this evaluation as one of the most important and compelling subjects for our attention.

There are great merits in encouraging this type of cooperation. It marks visibly the value and practicality of a European ideal. It enables larger and more ambitious programmes to be attempted. Finally, it enables those coming from countries where research activity in this field is at a lower level, to play a full part in the work and, in the process, speed the development and training in their homelands.

It appears from our discussions that the coordinators of these contracts can be rather arbitrarily divided into two types. On the one hand, there are those who preside over a collection of fairly loosely linked individual projects and, on the other, those who direct and lead tightly integrated projects with the work quite firmly planned and phased and supervised but taking place in geographically scattered laboratories. The amount of time necessary for management and administration of contracts varies considerably. In some cases, when only occasional liaison meetings need to be held or are felt to be necessary, reports can be organized by post or other communication mechanisms. In others, there is a need for frequent meetings and the administrative load, including drafting of proposals, quality control and financial management, can amount to a very heavy workload which cannot often be delegated further down the line. We note that a paper on the amplification of the role and responsibilities of coordinators has been prepared for the CGC. We have also heard that some coordinators have expressed the view that these administrative burdens should attract special funding.

Previous evaluation reports have commented on the perceived complexity of the form filling, expenses accounting and reporting, and it is in this area that we have encountered the strongest criticism. Delays in payments and clumsy bureaucracy in other parts of the Commission administration have been described to us including one instance where a report was demanded before any payment had been made. From our own experience this does not astonish us!

It also seems that cooperation from the ground up is much more likely to succeed than what might appear to be "cosmetic" cooperation with new and sometimes numerous partners being drafted into projects by persuasion by EC officials. This certainly leads to discontent among some scientists who feel that they will not succeed in grant applications unless they go along with this rather critical synthesis. As the programme develops and cooperation expands this will doubtless diminish. It also has to be mentioned that, notwithstanding the long history of the programme with individual contracts, the transition towards multi-national contracts was implemented smoothly and efficiently.

On the other hand, cooperative proposals developed from the ground up by scientific discussion groups such as EULEP, EURADOS and IUR, have been extremely fruitful

and fulfilling. There is an area for debate here which might support a need for a policy review as we indicate in our recommendations.

For the sake of completeness, although it is outside the period which we are reviewing, mention should be made of the PECO projects. This endeavour is financed by a separate grant voted by the European Parliament and brings into coordinated project teams individual scientists from central and east European countries. This matter is of relevance to the general question of the costs and activities of staff involved in coordination but has not been specifically studied by us.

A brief questionnaire was sent to some scientists who are hoping to take part but it is too early to make any reasoned evaluation. Our own tentative enquiries are also incomplete. There is no doubt at all that the PECO programme is important and has great potential. It is also clear that its preparation and development have involved Commission staff and scientists across the EU in considerable effort. There does appear to be incomplete understanding of the programme in the countries concerned and, undoubtedly, there is a need, after results begin to become manifest, for more effective evaluation than we have felt able to achieve. We endorse the view that this could well become a useful mechanism for pan-European research activity.

4.1 Funding Levels

Linked with these considerations in the previous section, there is the question of the level of funds provided by the EU. At present, the proportion between the level of funding with respect to total costs is often quite low (somewhere around 20%). If complexity of accountancy and administration, no matter what the cause, becomes too great, there must be a tendency to look elsewhere for funds or worse still reduce the level of activity in the field. That would be to the disadvantage of the Community and should if possible be avoided. It is difficult to escape the conclusion that assistance is being spread too widely and too thinly. If it is, and it probably is, unrealistic and unhelpful for us simply to recommend that more money be made available, it would appear inevitable that fewer programmes should be more adequately supported. It could be argued that this would have a further beneficial effect by reducing the enormous load on EC officials and on the Committees and experts in many countries who support them. It then becomes even more important that the highest critical standards should be applied to the scientific selection and funding of projects and that political considerations and their effect on the overall scientific budget available should be clearly understood. There is however, another side to this argument. Acceptance of a project by the Commission for funding conveys a certain cachet. This may be of particular importance for smaller units and University departments. It is very important that the programme should not be, or appear to be, dominated by a few of the larger research laboratories.

Aspects such as training and developing research resources throughout the EU should not be neglected and in Chapter 5 we consider some of the ways forward in that area.

5. Cooperation with other Directorates

The main frontier identified is that between the Radiation Protection Programme and other research units of DGXII and other Directorates General. We were told in one interview that cooperation with the Radiation Protection Programme is "infrequent, informal and friendly". It is perfectly true that to make consultation too formal can fossilize it but we were left with a slightly uneasy feeling that unless there was at least one individual in each department motivated to ensure continuity of consultation, it might well not occur. This is particularly important in areas of research where there is clear overlap, or potential overlap, such as studies of carcinogenesis. In one or two areas such as the Fusion Programme, the need for an increase in future cooperation is already recognized.

It is impossible to put research areas into watertight compartments. In fields such as the study of carcinogenesis many parts of the Commission's programme may be involved. As far as we can ascertain, personal contacts and goodwill are the main methods of avoiding overlap or conflict in these areas. There are, however, other aspects. Molecular biology is a very rapidly expanding field of great high scientific interest and of great popularity with young scientists. It is important, as we discuss elsewhere, that work in this area should continue in the Radiation Protection Programme because of its relevance to the objectives of that programme and because if that does not happen the competing pressure of other prestigious fields of research will remove young scientists from this area. Considerable concern has been expressed to us along these lines and it is a matter for the Commission officials to consider whether more formal methods, such as a registration of projects in certain fields or periodic meetings of those interested in neighbouring areas of research should be convened. We were encouraged to hear of the success of meetings of coordinated groups, not only within their own group but with what could be described as neighbouring groups, and would like to suggest that something along these lines could be planned outside, or alongside, the border of the Radiation Protection Programme itself.

CHAPTER 7

CONCLUDING DISCUSSION

In Chapter 2 on Evaluation Methodology we set out the terms of reference for and the aims of the Panel. In preceding chapters we have endeavoured to discharge that duty in some detail and the Executive Summary and the Recommendations have tried to pull together the main conclusions. We have borne in mind the respective costs and benefits relating to these activities but we have not found it easy to use any specific quantitative indicators either for the individual projects or indeed for the programme as a whole. This is partly because radiation protection research is only one of the factors impinging on the radiological health and safety of the citizens of the EU. We return to this topic later in the chapter. Our recommendations and some more detailed observations in earlier chapters should indicate to the reader that we feel that the programme is on the right lines and, with the fine tuning modifications which are inevitable in any changing scientific field, should continue profitably in the years ahead. We think that the scale of effort is about the minimum necessary. The programme is relevant and contains a balanced mixture of fundamental and more applied research. Where we have criticisms they are mostly of an administrative nature and they are not surprising in a system of this magnitude with such a broad base and with an emphasis on collaboration which we enthusiastically endorse.

There are, however, some aspects which, while not obviously directly relevant to our particular review are relevant to the overall assessment of the value to be gained from all this work. No scientist is going to deny the value of the pursuit of knowledge for its own sake. There is general agreement, over the years, the radiation protection research programme has contributed much to our understanding of underlying mechanisms and that advances in knowledge have been most effectively communicated among scientists, not only in the EU but throughout the world. The pace of advance in this field is exhilarating and we highlight some particular examples. The emphasis on the importance of understanding more and more about low dose and low dose rate effects is clearly vital both for scientific knowledge and for its relevance to standard setting and comprehension of risk. Population studies, advances in the preparation for emergencies and for the subsequent care of any victims move steadily forward. The control of medical exposure and the transmission of technical advances improving that control is making real progress. Training, about which we have some reservations to do with methods of funding and other arrangements, has over the last year or two advanced.

One common theme has been around in all our discussions and seriously affects the ultimate benefit to the EU and to the world at large of all these activities. We are certain that the science is good and that it is effectively broadcast among scientists. That is the essential foundation for a successful radiation protection programme and we are convinced that it is secure. Having said that, it would be a brave man who would say that public perception or even the perception of regulators and politicians has always given full weight to this knowledge.

There have been large reductions in the doses related to occupation and detailed studies have enabled targets to be set for measures to be taken after accidental events. Great care has to be taken that this continual ratcheting down is not pushed too far so that there is a vanishingly small gain in reduction of risk obtained at a disproportionate cost. If such steps are taken arbitrarily and without proper scientific support the whole system of radiation protection which has been so laboriously achieved would be thrown into disrepute.

As far as public exposure goes the most pressing problem to resolve is that radon and this has been given full weight in the very relevant research going on in the programme to outline and underpin the best cost-effective approaches.

We feel compelled to mention an aspect which, though not strictly in our remit, is relevant to our thinking. There is no doubt that public perceptions and attitudes, together with the activities of well organised pressure groups, make difficult the position of those who have to make public decisions and set exposure standards. We do not underestimate the problems of explaining balanced science to the general population nor the efforts that have already been made but feel compelled to point out that the value of this excellent research programme could be diminished if this type of broad education is not widely spread, not only in the activities of Directorate General XII but across the board.

CHAPTER 8

RECOMMENDATIONS

General

1. The present programme is effective and we recommend its continuance to at least its present level of support. The present management of the programme is successful but the load on Commission staff should, we recommend, be reduced.

2. There has been a considerable loss of public confidence in science and scientists over the past two decades. It is hard to see how this can be addressed by the programme other than by continuing to produce sound scientific work. However, we feel that this is so important that the attention of other Directorates should be drawn to the need for a strong programme of public information, research and education, to attempt to address the present incomprehension and fear about radiation risks. Particular attention should be paid to the education of groups, such as general medical practitioners who may have the most significant effect on public perception and understanding and whose basic comprehension may be low.

3. There should be a system of rotation for members of those serving on the CGC and, in particular, consideration should be given to how smaller research organisations should be more positively represented.

Research

4. Biological dosimetry research should continue to be treated as a priority area.

5. A strong base of fundamental research must be sustained to provide the foundation to undergird the broad range of applied research needs.

6. Particular importance is attached to studies of the effects of low doses and low dose rates and the significance of such studies for public policy and understanding.

7. Continued close interaction with the United States' effort to develop a radiobiology database is strongly endorsed.

8. Initiatives must be exercised to ensure that molecular biology insights and technology is applied to radiation protection research.

9. Further efforts to accomplish pooling of epidemiological data are highly encouraged to improve the statistical power of the research. Small scale studies of inadequate power should be discouraged.

10. One field in which there is a difficult conflict of evidence and interpretation is that of the possible health consequences of radon exposures. We recommend that a high priority be given to this part of the programme.

Training

11. Separate funding arrangements for training should be identified. The need to provide a regular intake of able scientists to the radiological protection field was stressed by previous evaluations and we would confirm their concern. Our report shows that much has been done but this must be a continuing and probably increasing effort. There should be a clearly defined training budget (not part of the research budget) and a training management structure involving staff and member states which is visible and active. Activities as part of the research programme should not be confused with these operations.

12. Education and training activities of the EC should be harmonised with similar activities of other international organisations and scientific bodies (e.g. IAEA, ILO, WHO, IRPA), in respect of both the teaching materials and the target groups.

13. The possibility of issuing a certificate on successful participation in an organised training course, which would have a European-wide recognition, seems to be a pressing need already. This should be referred as a matter of urgency to the new training management structure recommended above.

14. More emphasis should be given to training courses organised for senior scientists (teaching of teachers) and letting the national organisations convey the knowledge so obtained to the individual users or to the radiation protection practitioners.

15. Full use should be made of arrangements for bursaries to encourage attendance at recognised training courses run by national authorities. There should be a registry of such courses maintained by the EU.

Programme Management

16. The use of Association Agreements should be extended.

17. We support the proposals for clarification of the role of co-ordinators and for fuller interaction in certain aspects of the programme between the co-ordinators themselves.

18. While supporting enthusiastically the value of multi-national projects, we would like to see that talented individual academics who might not fit easily into such schemes should be able to look for and, where appropriate, find support.

19. We recommend the continued support for EULEP, EURADOS and IUR and their role in the generation of collaborating teams.

Collaboration

20. Studies of contamination and of human over-exposures should not be limited to or dominated by the consequences of the Chernobyl accident. Earlier incidents of various kinds should also be the subject of such study since material of enormous

value must be available. Extra attention should be paid to assessment and treatment of acute radiation syndrome and other non-stochastic effects.

21. The exchange of scientists between the CIS and the EU should be supported.

22. The post-Chernobyl part of the programme and the PECO actions should be separately evaluated in a year or two once significant results can be presented.

23. Increased attention should be paid to studies of the psycho-social consequences of measures such as sheltering and evacuation following environmental contamination. Studies of this nature will help in the judgement of cost-benefit considerations associated with such measures.

Administration and Funding

24. The level of support for individual projects should not be lowered. While recognising the need for financial stringency, we consider the present extent of the programme to be the minimum necessary for viability and that simply reducing the amount given to individual projects in order to support more projects would not be the correct way forward.

25. Ways must be sought to limit the delays in formulating and starting projects.

26. We repeat previous recommendations about the need to strengthen links between the radiation protection programme and other research units in DGXII and other Directorates General. This may require a somewhat more formal mechanism than exists at present.

27. The peer review system should be looked at to ensure, as far as possible, transparency, and to allow accessibility to the programme of smaller research units and innovative and less orthodox scientific approaches. This recommendation reflects an unfulfilled recommendation of a previous panel.

28. Continuing attention should be paid to bringing the results of research activities to the notice of those concerned with standard setting. Links with DGXI must be firmer and more formalised. It should be considered whether there should be a formal requirement to consult as part of Article 31 procedures and to record that such consultation has taken place.

29. Close interaction with the United States Department of Energy's (DOE) research programme in radiation dosimetry and instrumentation is urged, particularly during the current period of apparent reassessment of priorities by DOE's Health and Environment Research Programme Management.

30. Interaction with other research programmes outside the European Union should also be continued and developed.

ANNEX 1

LIST OF PANEL MEMBERS

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Prof. Marcello QUINTILIANI, Institute of Biomedical Technology (CNR), Roma, ITALY

Prof. Laszlo B. SZTANYIK, Director General, National Research Institute for Radiobiology and Radiohygiene, Budapest, HUNGARY

Dr. Robert W. WOOD, Department of Energy, Washington D.C., USA

ANNEX 2

EXPERTS INTERVIEWED BY THE PANEL

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Dr. S.T. Belyaev	CEC/CIS Project Coordinator
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Mr. B.F. Wall	Project Coordinator

European Commission

EUR 15878 - Evaluation of the Radiation Protection Research Action (1990-1991 and 1992-1993)

R. Braams, P. Duncan, M. Quintiliani, L.B. Sztanyik, R.W. Wood

Luxembourg: Office for Official Publications of the European Communities

1994 – LXII, 54 pp. – 21.0 x 29.7 cm

Science and Technology policy series

ISBN 92-826-8614-0

Price (excluding VAT) in Luxembourg: ECU 13.50

On the basis of the legal requirement to evaluate (Framework Programme Council Decision 87/516/Euratom, EEC and Council Decision 89/416/Euratom), a panel of six independent experts, chaired by Prof. R. Braams was appointed by the EC in order to evaluate the 1990-91 and 1991-92 Radiation Protection Research Actions.

Between February 1993 and January 1994 the panel met in Brussels on eight occasions and in Paris on one. Interviews were carried out with selected project co-ordinators and participants and with members of the programme's advisory and management committee. Since the panel considered the EC/CIS co-operation as a very important element of the programme, one meeting was devoted to interviews with scientists from the CIS who participate in the joint EC/CIS projects.

In depth reviews were carried out on randomly selected projects. The panel's principal recommendations include the continuance of at least its present level of support, the co-operation with other Directorates in a strong programme of public information research and education to attempt to address the present incomprehension and fear about radiation risks with particular attention given to groups such as general medical practitioners, and finally the establishment of a rotation system for the members of the programme's advisory and management committee in order that the scientific community and smaller research organizations could be more positively represented.

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